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NetWare® Connection

August 1997

The Magazine for Novell® Networking Professionals

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GroupWise WebAccess takes groupware from your desktop to the Internet.

FEATURE

6 GroupWise WebAccess: It's Everywhere Users Want to Be

Now that laptop computers, modems, and the Internet are ubiquitous, more users are leaving their offices and working from home or on the road. With GroupWise WebAccess, these users can access their GroupWise 5 universal mailbox through the World-Wide Web (WWW).

Correction: We made a mistake! We inadvertently imported the wrong graphic on page 18. Figure 8 actually shows how you can add more GroupWise WebAccess Interfaces to your network (a concept discussed on page 20). You can view the correct Figure 8 by visiting the *NetWare Connection* WWW site at http://www.novell.com/nwc.

22 BorderManager Caches in on the Web

In addition to providing security, connectivity, and management features, Novell's new BorderManager product offers a proxy component that speeds up users' access to the WWW. Find out how one company is using BorderManager to significantly reduce the amount of time users spend waiting for WWW files.

NOVELL CERTIFIED PROFESSIONAL

32 Preserving WAN Bandwidth

You deal with traffic jams as you commute to and from work, so the last thing you need is a slow WAN link at the office. This article explains how you can improve performance over a WAN link by optimizing processes such as NetWare serialization, NetWare Core Protocol (NCP) watchdog, SPX keep alive, and queue sampling.

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NETWARE CONNECTION

AUGUST 1997 Online

A NEW LOOK FOR NETWARE CONNECTION

Whether you frequently visit the *NetWare Connection* World-Wide Web (WWW) site or haven't yet taken the time to check out our site, you won't want to miss the unveiling of our site's new design on August 1.

To see our new design go to the *NetWare Connection* home page and then browse the other pages on our WWW site. After you have become familiar with the new look, please send your compliments, complaints, and suggestions to nwc-editors@novell.com.

http://www.novell.com/nwc

38 InfiLearning Centers: Novell Education Takes on Multivendor Training

After years of hearing that multivendor training is just around the corner, you have probably given up hope that it will ever become reality. Find out how Novell Education has launched multivendor training by creating InfiLearning Centers, which feature a variety of courses by several companies and the industry's first multivendor Internet certification program.

COLUMN

40 Practical Networking: New Moves in Windows 95

NetWare Connection has a new column: In each issue, "Practical Networking" will offer tips and step-by-step instructions that you can use to perform useful tasks on your company's network or intranet. The first edition of "Practical Networking" focuses on two networking tasks that you can perform from your Windows 95 workstation.

46 Online Connection: Taking Stock

Money may not grow on trees, but it does grow on the stock market. If you are an investment novice who wants to dabble in stocks without having to hire a professional stock broker or if you are an experienced investor who needs real-time stock quotes and up-to-the minute financial news, you should visit the WWW sites mentioned in this article.

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LETTERS TO THE EDITOR

MAD About Novell Administrator for Windows NT

Thank you for the article about Novell Administrator for Windows NT in the June 1997 issue ("Novell Administrator for Windows NT: One-Stop Management for Your Network," pp. 6–14). I only wish that I'd had this article to help me the first time I installed Novell Administrator for Windows NT. The installation instructions provided by Sandy Stevens could have saved me a lot of grief!

I work for a company in Houston, Texas, and companies in this area have gone crazy for Windows NT. Several companies that converted their network completely to Windows NT are now rethinking their decision because of the high cost of managing an all-Windows NT network. Because Microsoft Active Directory (MAD) is a joke, Windows NT won't get any better on the front end. Now that Novell has released tools such as Novell Administrator for Windows NT, perhaps companies will begin using Windows NT only for its strength—as an application server.

Kevin C. McIntosh

A Dynamic Article

I would like to commend you for your excellent overview of the changes that are taking place in the computer field and their implications for the future. The May 1997 issue was truly well done, and the article by Terry L. Jeffress was particularly excellent ("Dynamic Web Pages With IntranetWare," pp. 6–20).

Jimmy A. Castro

Recently, I have been helping two companies set up Internet/intranet servers using IntranetWare. As mentioned in "Dynamic Web Pages With IntranetWare," IntranetWare supports Server Side Includes (SSI) commands. However, I have found that SSI commands have some limitations: For example, SSI lacks file manipulation commands, such as the COPY, RENAME, MAILTO, and DELETE commands. SSI commands are not very useful if they do not allow you to manipulate files; instead, you might as well use Common Gateway Interface (CGI) scripts, which do allow you to manipulate files.

Given that no SSI MAILTO command exists, can you use SSI commands to send a text file generated by an online form via e-mail? If so, how?

Anonymous

You can use the SSI EXEC command to call a NetWare Loadable Module (NLM) that would send a text file generated by an online form via e-mail. However, you would have to write this NLM yourself to handle the necessary input parameters and mail protocols.

As you correctly assessed, the easiest way to send a text file from an online form is to use a CGI script such as a Perl script. You can find a sample Perl script that sends Simple Mail Transfer Protocol (SMTP) mail from a HyperText Markup Language (HTML) form in the Novell Web Server 3.1 toolkit, which also includes other sample files and scripts that you can customize to meet your needs. You can download this toolkit from the NetWare Connection *World-Wide Web (WWW) site (http://www.novell.com/nwc/archive/ws3tk2be.html).*

Correction

I edited the LZFW.INI file and downloaded the Moab trace file as described in the June 1997 issue of *NetWare Connection* ("IntranetWare Over TCP/IP," pp. 30–39). However, LANalyzer for Windows 2.2 still could not display any NetWare Core Protocol (NCP) information. After viewing the LZFWTEMP.INI file on the CD-ROM containing the alpha version of Moab, I noticed that the syntax in this file differs from the syntax in the article, which says to add the following line to the LZFW.INI file:

```
ncp(ncp/udp)=NetWare,udp,TCP/IP,300,0,0,0,0
```

The line in the LZFWTEMP.INI file, on the other hand, has a different syntax:

```
ncp(nudp)=NetWare,udp,TCP/IP,524,0,0,0,0
```

Jeff Maxwell

The line in the LZFWTEMP.INI file is correct. We apologize for the error. ●

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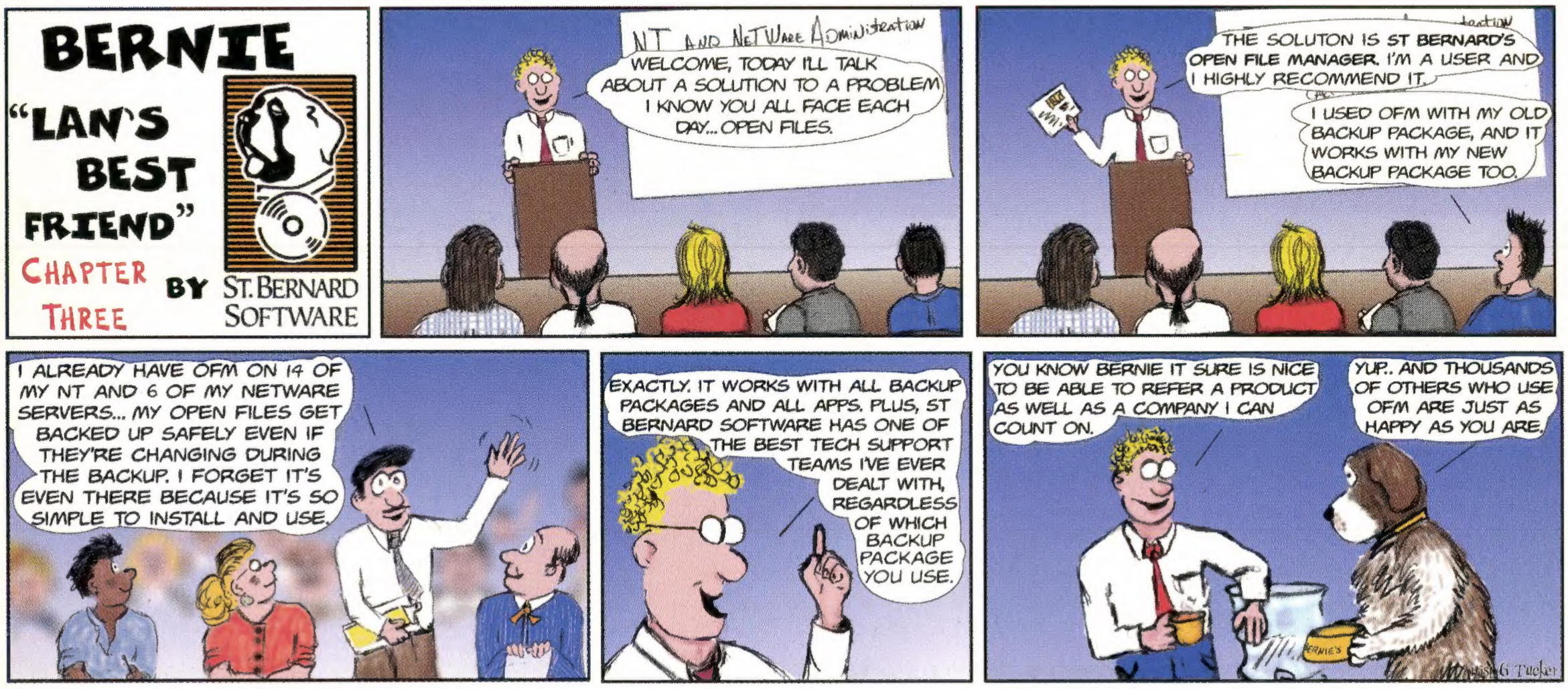

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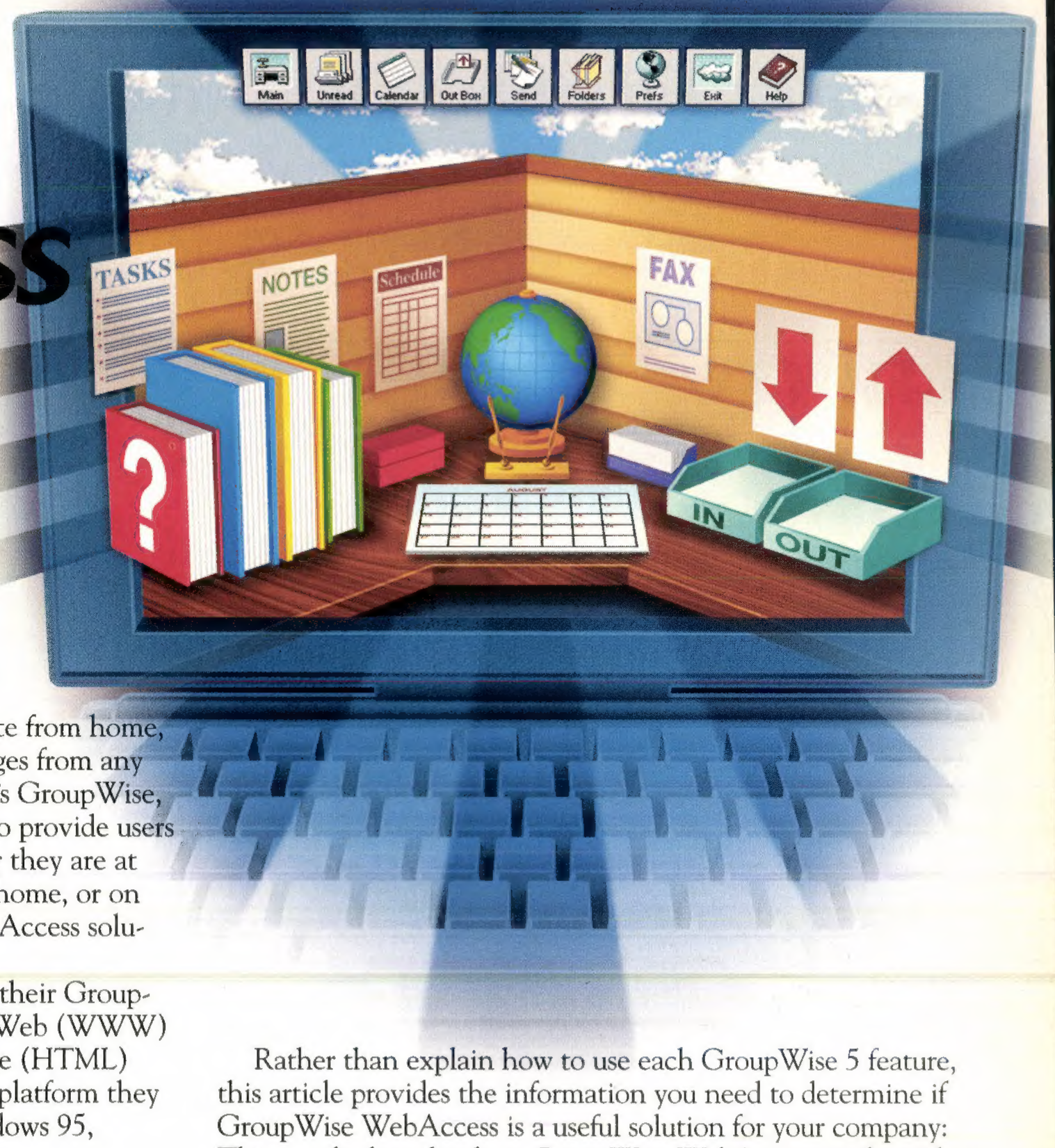

Terry L. Jeffress

Because today's users often travel or telecommute from home, they must be able to access their e-mail messages from any location at any time. If your company uses Novell's GroupWise, you can use the GroupWise WebAccess gateway to provide users with access to the information they need, whether they are at your company's main office, at a branch office, at home, or on the road. (Novell also provides a GroupWise WebAccess solution for GroupWise 4.1.)

With GroupWise WebAccess, users can access their GroupWise 5 universal mailbox through a World-Wide Web (WWW) browser that supports HyperText Markup Language (HTML) 1.0. As a result, users can choose any workstation platform they prefer, including Windows NT Workstation, Windows 95, Windows 3.1, Macintosh, and UNIX.

Instead of launching the GroupWise 5 client, users use their browser to access the GroupWise WebAccess home page on your company's intranet or Internet site. Users then enter their GroupWise 5 username and password and click the Login button to access their GroupWise 5 universal mailbox.

The GroupWise WebAccess interface is intuitive, and users can access most of the features available with the GroupWise 5 client. For example, users can complete the following tasks:

- Read and send e-mail messages
- Keep track of personal appointments, tasks, and notes
- Schedule meetings and find out if other users accept or decline invitations to these meetings
- Assign tasks to other users and track the status of these tasks
- View text files and attachments that comply with the Multipurpose Internet Mail Extensions (MIME) standard
- Send Internet e-mail messages with the GroupWise SMTP/MIME Gateway
- Send fax messages with the GroupWise Fax Gateway
- Send messages to numeric or alphanumeric pagers with the GroupWise Pager Gateway
- Listen to voice-mail messages with the GroupWise PhoneAccess gateway

Although GroupWise WebAccess supports most GroupWise 5 messaging and scheduling features, some features are available only to users using the GroupWise 5 client. (See "Features Unavailable Through GroupWise WebAccess" on p. 10.)

Illustration: Paul Johnson

Rather than explain how to use each GroupWise 5 feature, this article provides the information you need to determine if GroupWise WebAccess is a useful solution for your company: This article describes how GroupWise WebAccess works and explains how you can use GroupWise WebAccess to extend GroupWise 5 services to users via the Internet or a branch office. This article also outlines the GroupWise WebAccess installation process. (See "Installing GroupWise WebAccess" on p. 20.)

HOW GROUPWISE WEBACCESS WORKS

From a user's perspective, accessing GroupWise WebAccess is as simple as entering a uniform resource locator (URL) into a browser and then viewing the GroupWise WebAccess home page. To provide users with this seamless access, your company's network or intranet must include the following:

- A GroupWise 5 server
- A GroupWise 5 domain and post office
- A WWW server that supports GroupWise WebAccess
- GroupWise WebAccess, which consists of two components, the GroupWise WebAccess Common Gateway Interface (CGI) program and the GroupWise WebAccess Interface

The GroupWise WebAccess CGI program runs on the WWW server, and the GroupWise WebAccess Interface runs on IntranetWare, NetWare 4.1x, or Windows NT Server 4.0 or higher. (For a list of WWW servers that GroupWise WebAccess supports, see Figure 1 on p. 8.)

You can install both the GroupWise WebAccess CGI program and the GroupWise WebAccess Interface on one server, which is called the one-box solution. You can also install each component on a different server, which is called the two-box solution.

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Sun Solaris 2.3 or SunOS 4.13	Any	Netscape Commerce Server 1.12 or NCSA httpd 1.3	GWWEB.EXE	Does not run on UNIX
Windows NT Server 4.0	Any	Microsoft Internet Information Server	GWWEB.EXE	GWINTER.EXE

Figure 1. *In addition to supporting Novell Web Server 3.1 running on IntranetWare, GroupWise WebAccess supports several other WWW servers running on UNIX or Windows NT Server 4.0.*

(These installation options will be discussed later in the article.)

When a user sends a request through GroupWise WebAccess, this request follows the steps listed below. (See Figure 2 on p. 10.)

1. The user's browser sends a request to the WWW server that runs the GroupWise WebAccess CGI program.
2. The WWW server passes the request to the GroupWise WebAccess CGI program.
3. The GroupWise WebAccess CGI program sends the request to the GroupWise WebAccess Interface, which, in turn, sends the request to the GroupWise 5 server.
4. The GroupWise 5 server processes the user's request by accessing the necessary GroupWise 5 domains and post offices and sends the results of the request to the GroupWise WebAccess Interface.
5. The GroupWise WebAccess Interface sends these results to the GroupWise WebAccess CGI program.
6. The GroupWise WebAccess CGI program formats the results as an HTML document and forwards this document to the WWW server, which sends the document to the user's browser.

The WWW Server

The URL that a user enters to access GroupWise WebAccess points to a static page on a WWW server. This static page can be the WWW server's home page or, more likely, one of many pages on the WWW server.

If the static page is not the WWW server's home page, you must create a link to the static page on your company's intranet home page or on another prominent page on your company's intranet site. Users then click this link to access the static GroupWise WebAccess page.

This first page is the only static page that users access. The GroupWise WebAccess CGI program generates all other pages dynamically.

If you install support for multiple languages, a button for each language appears on the GroupWise WebAccess home page. Users can select the language they want to use by clicking the appropriate button.

When a user selects a language, the WWW server sends a message to the GroupWise WebAccess CGI program, which dynamically generates a login screen in the appropriate language. (See Figure 3 on p. 12.) After the user enters a GroupWise 5 username and password,

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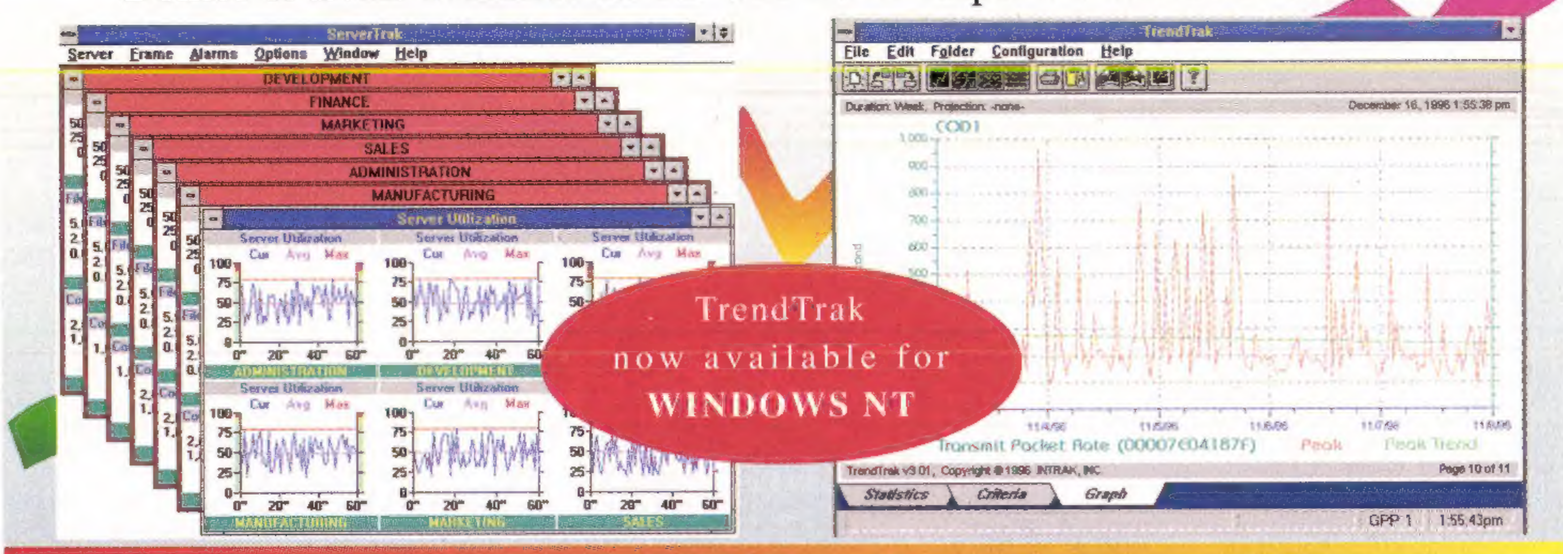

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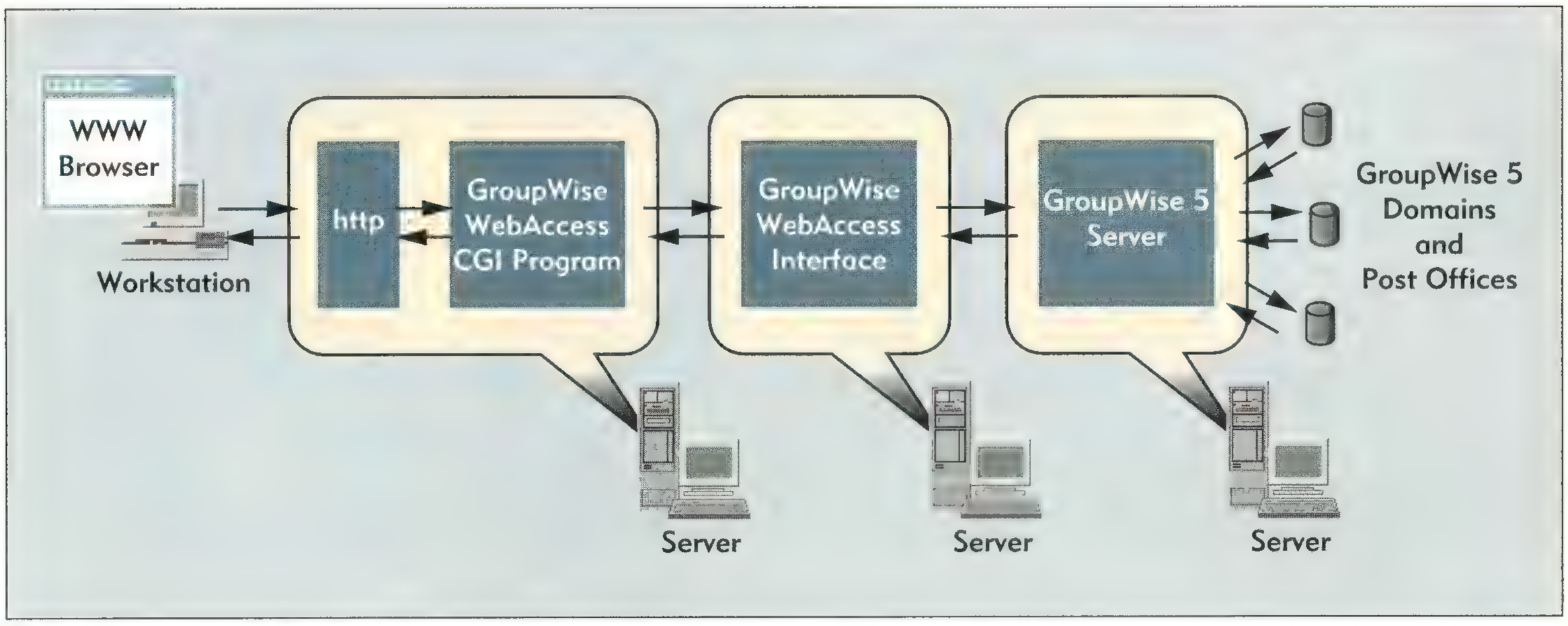

Figure 2. *A user's browser sends a request to GroupWise WebAccess, which processes the request and returns the reply to the user's browser.*

GroupWise WebAccess tries to authenticate the user. If the user is authenticated, the GroupWise WebAccess Main Menu appears. (See Figure 4 on p. 12.)

After providing the static GroupWise WebAccess page, the WWW server's only function is to pass the user's requests to the GroupWise WebAccess CGI program and to return the HTML documents generated by this program to the user.

The GroupWise WebAccess CGI Program

The GroupWise WebAccess CGI program performs two important functions:

- Sends a request from a user's browser to the GroupWise WebAccess Interface
- Formats the results of the request into an HTML document

For example, suppose that a user clicked the In Box button on the GroupWise WebAccess Main Menu. (See Figure 4 on p. 12.) The GroupWise WebAccess CGI program would request the contents of the In Box from the GroupWise WebAccess Interface. When the GroupWise WebAccess Interface returned the results—the contents of the In Box—the GroupWise WebAccess CGI program would format these results into an HTML document. (See Figure 5 on p. 16.)

The GroupWise WebAccess CGI program uses templates to speed up the process of building HTML documents. After receiving data from the GroupWise WebAccess Interface, the GroupWise WebAccess CGI program places this data in a template. You can customize this template to add features such as a corporate logo or links to important pages on your company's intranet site. (For more information about customizing templates, see "Customizing the GroupWise WebAccess User Interface" on p. 14.)

The GroupWise WebAccess Interface

The GroupWise WebAccess Interface performs all of the functions that the standard GroupWise 5 client performs, including reading from, writing to, and searching the GroupWise 5 database. Communication between the GroupWise WebAccess CGI program and the GroupWise WebAccess Interface is efficient and secure. When responding to a user's request, the GroupWise WebAccess Interface sends raw data (in an encrypted form) to the GroupWise WebAccess CGI program, conserving bandwidth on the cable between the GroupWise WebAccess Interface and the GroupWise WebAccess CGI program.

In contrast, the communication between the GroupWise WebAccess Interface and the GroupWise 5 database, although just as secure, uses much more bandwidth. This communication uses more bandwidth because fulfilling a user's

Features Unavailable Through GroupWise WebAccess

GroupWise WebAccess provides most of the features available with the standard GroupWise 5 client. However, the following features are available only with this client:

- Archive messages
- Auto-date
- Busy search
- Customize the button bar
- Calendar week and year views
- Custom views
- Filters
- Macros
- Notify
- Preferences (except password and number of messages displayed)
- Proxies
- Resend a message
- Reschedule an appointment
- Routing slips
- Rules
- Selecting public and personal groups from the GroupWise address book
- Selecting resources from the GroupWise address book
- Send attachments
- Send options, such as Priority and Reply Requested
- Shelf
- Sort
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- Writing tools, including spellcheck, thesaurus, Grammatic, and QuickCorrect

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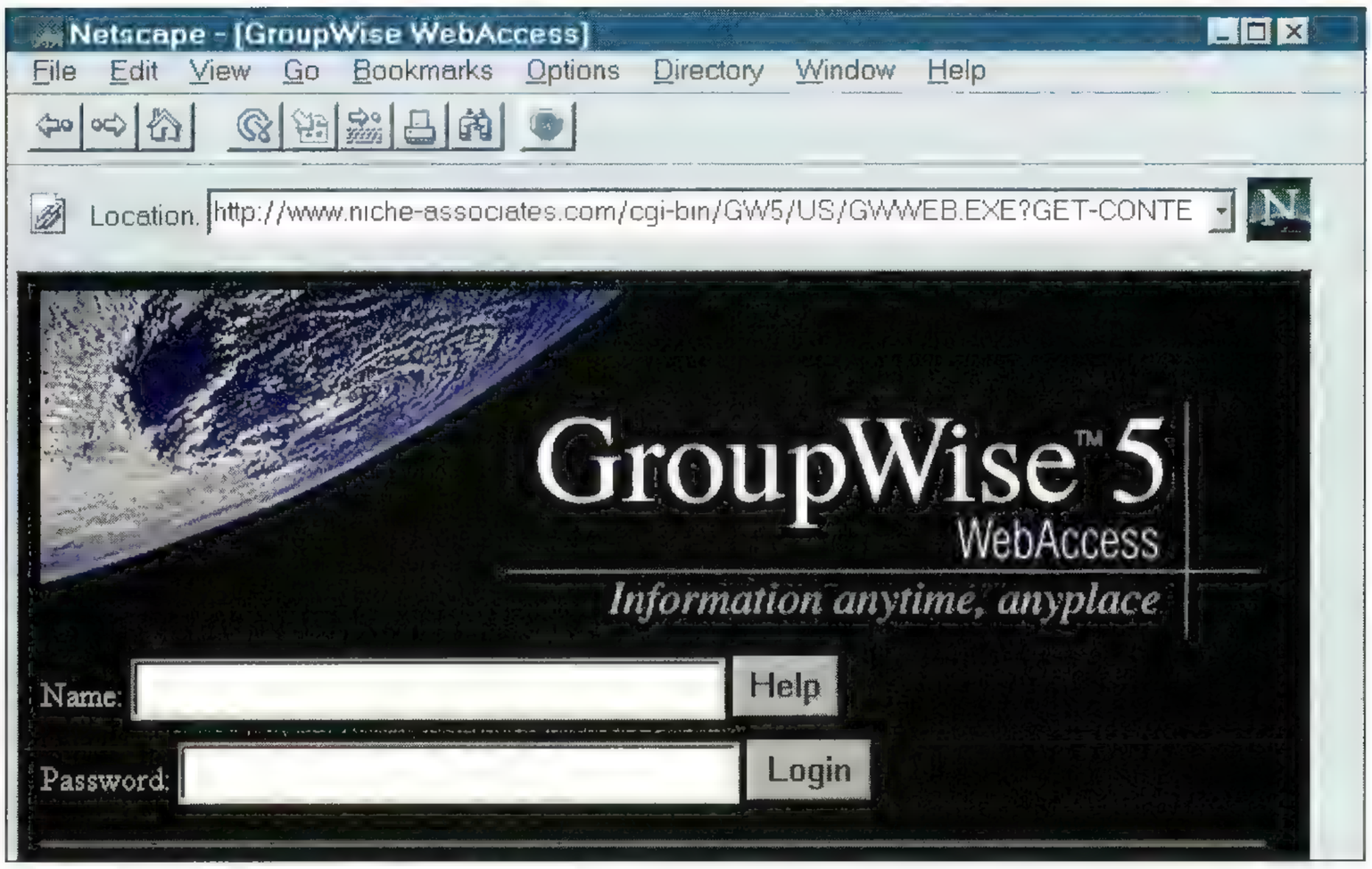

Figure 3. *The GroupWise WebAccess login screen*

request often requires multiple queries of the GroupWise 5 database.

INSTALLATION OPTIONS

As mentioned earlier, you can install GroupWise WebAccess in several configurations. If you choose the one-box solution—installing the WWW server, the GroupWise WebAccess CGI program, and the GroupWise WebAccess Interface on one server—you increase the processing speed. Because all of the GroupWise WebAccess components reside on the same server, they can communicate through the server's high-speed internal bus, rather than over the network. This solution is also more convenient since you must configure and maintain fewer servers.

If you have a server with sufficient resources, you can install the WWW server, the GroupWise WebAccess CGI program, the GroupWise WebAccess Interface, the GroupWise 5 server, and the GroupWise 5 database on the same server. However, this configuration is probably not practical since the server could become a bottleneck if the WWW server or the GroupWise 5 database received a large number of requests.

You can also install the GroupWise WebAccess components on separate servers: The WWW server and the GroupWise WebAccess CGI program run on one server, and the GroupWise WebAccess Interface runs on another server. You can install the GroupWise WebAccess Interface on any server on your intranet, as long as the GroupWise WebAccess Interface and the GroupWise WebAccess CGI program can communicate. In general, however, you should install the GroupWise WebAccess Interface near or on the server that runs the GroupWise 5 server. (The next section explains two-box solutions in more depth.)

Because the GroupWise WebAccess components communicate via TCP/IP, you must enable TCP/IP on the servers that hold these components. You must also ensure that your company's network or intranet supports TCP/IP between the two servers.

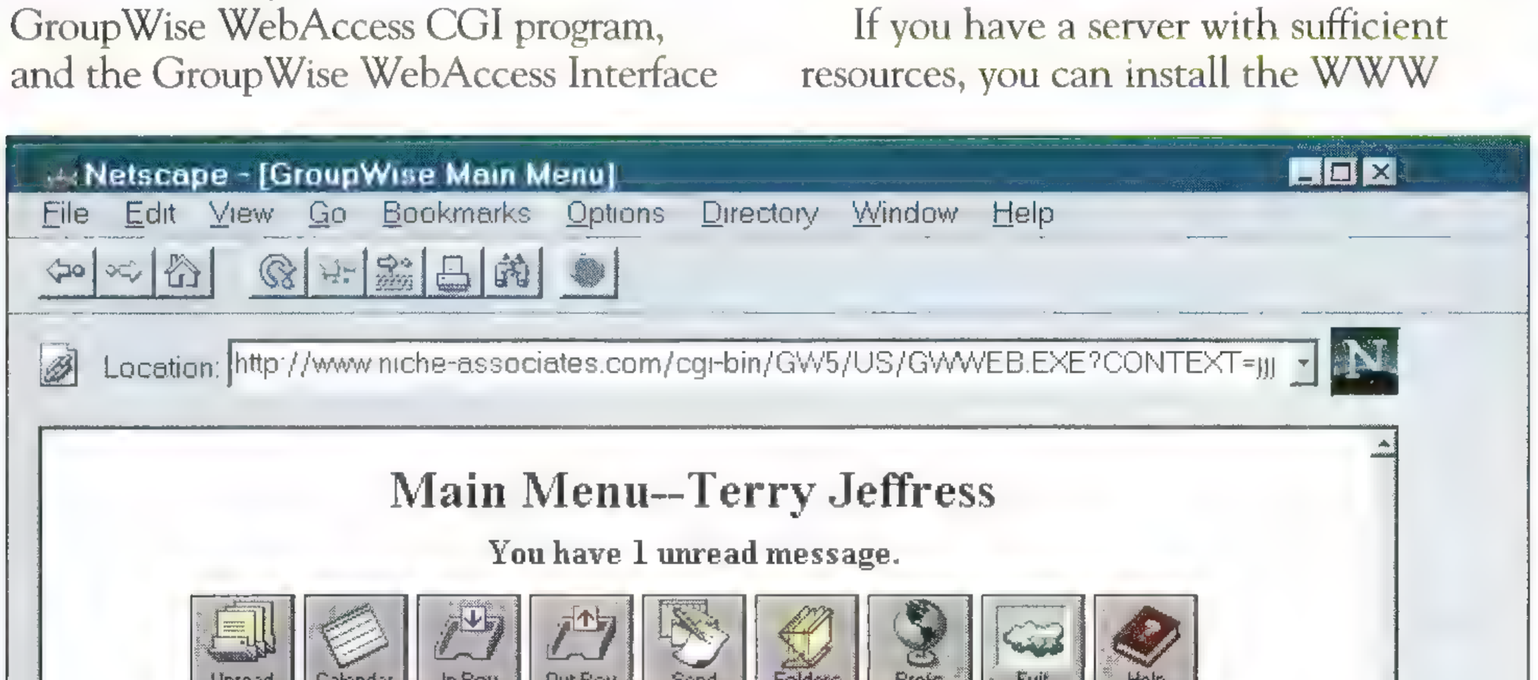

Figure 4. *The GroupWise WebAccess CGI program dynamically generates the GroupWise WebAccess main menu.*

A SOLUTION FOR EVERY COMPANY

Because GroupWise WebAccess has a modular architecture, you can customize it to meet the needs of your users and your company's network or intranet. For example, you can configure GroupWise WebAccess to provide users with access to their GroupWise 5 universal mailbox from a variety of locations. You can also configure GroupWise WebAccess to ensure that GroupWise 5 communications remain secure and use the least amount of bandwidth.

GroupWise WebAccess From Your Company's Main Office

You can use GroupWise WebAccess to improve communications within your company. For example, you could use GroupWise WebAccess in the following ways:

- Because GroupWise WebAccess requires a browser that is only HTML 1.0 compliant, users can use older computers as GroupWise WebAccess terminals. For example, instead of retiring

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Customizing the GroupWise WebAccess User Interface

Would you like to change some aspect of the GroupWise WebAccess user interface? Maybe you don't like the earth graphic that appears on the login pages. Or maybe you don't like the icon for the Send button or the image map on the main menu. With most applications, you cannot change the interface, even if you don't like it.

If you don't like the GroupWise WebAccess user interface, however, you can change it. In addition to making minor changes such as choosing a new text font or color, you can completely redesign the GroupWise WebAccess user interface. You can make any of the following changes:

- Add your company logo to the opening page (or even add your company logo to every page)
- Modify or replace the graphics
- Modify or add help pages
- Redesign the layout and content of pages to suit your company's needs

To make most minor changes, all you need is a good understanding of HyperText Markup Language (HTML). To make substantial changes, you also need some programming experience.

THE GOOD NEWS

To create the HTML pages that users see, the GroupWise WebAccess Common Gateway Interface (CGI) program uses templates and graphics stored in a special directory on the World-Wide Web (WWW) server. (If you are using Novell Web Server 3.1, the English versions of these files are stored in SYS:\WEB\CGI-BIN\GW5\US\HTML1.) If you change the templates or graphics in this directory, you change what users see when they use GroupWise WebAccess. For example, if you wanted to change the graphic for the Exit button, you would complete the following steps:

1. Locate the filename of the existing Exit button: BGLOGOUT.GIF. (In most browsers, you can find the graphic's filename by right-clicking the graphic.)
2. Use a graphics application to modify the graphic or to create a new graphic.
3. Save the new graphic with the same filename as the original.
4. Replace the old graphic with the new graphic in the GroupWise WebAccess template directory.

You can follow these steps to customize every GroupWise WebAccess graphic, changing the look of the entire user interface.

THE BAD NEWS

Although replacing graphics is easy, changing the layout and structure of the GroupWise WebAccess pages is more complicated. The GroupWise WebAccess template directory contains 33 files that appear to be standard HTML files because they have the .HTM extension. These files do contain HTML commands, but they also contain additional commands that are interpreted by the GroupWise WebAccess CGI program. For example, the following is an excerpt from the MSGLIST.HTM file:

```
<body><h4>
<SET a = Msg-Count><DEC a>
<b>
<a href="/cgi-bin/GW5/<DISPLAY LANG>/GWWEB.EXE?CLOSE-
    BOX&MORE=<DISPLAY
More>&CONTEXT=<DISPLAY Context>&FOLDER-DRN=<DISPLAY
Folder-Drn>&FOLDER-EXT=<DISPLAY Folder-Ext.SHOW=
    ESCAPEURL>"><img
src="/cgi-bin/GW5/<DISPLAY LANG>/GWWEB.EXE?HTMLVER=
    <DISPLAY HtmlVer>&GET=GIF/GBMAIN.GIF" alt="[Main] "
    border=0 align=middle></a>
```

Before this text is sent to the user's browser, the GroupWise WebAccess CGI program scans the text for the GroupWise WebAccess commands. This particular example shows the DISPLAY command in several places. The GroupWise WebAccess CGI program replaces all DISPLAY commands with the value of the variable listed with the DISPLAY command. In all, the GroupWise WebAccess CGI program interprets nine commands: IF, /IF, ELSE, SET, INC, DEC, DISPLAY, WHILE, /WHILE.

Two other challenges make customizing the GroupWise WebAccess user interface more difficult:

- The HTML document the user sees is often created from more than one template. For example, to display the contents of the user's InBox, the GroupWise WebAccess CGI program starts with the MSGLST.HTM file, adds one MSGDSPL.HTM file for each message in the user's InBox, and completes the page by adding the MSGEND.HTM file. Because the GroupWise WebAccess CGI program looks for files by specific filenames, any files you modify must have the same filename as the original.
- If you want to display data from the GroupWise 5 database, you must learn how to construct database requests using the correct syntax.

With these challenges, customizing the GroupWise WebAccess user interface might seem daunting, but even beginning programmers should be able to follow the logic of the template files. As a result, customizing the GroupWise WebAccess pages is mostly a tedious process of constructing all of the CGI requests.

For more information about customizing the GroupWise WebAccess user interface, see "WebAccess Customization Guide," which is available from the Novell Support Connection WWW site (http://support.novell.com). (To find "WebAccess Customization Guide," search for document number 2913087 by clicking the Search button and entering 2913087 in the Novell Knowledge Base field on the Search page. Although this document was written for GroupWise 4.1 WebAccess, most of the information also applies to GroupWise 5 WebAccess.)

AND FOR THE REALLY DARING . . .

If you are looking for a challenge, you can write your own Java applets that request GroupWise 5 data and present that data in its own format. For example, you could write a Java applet that would display a calendar page for the current month and all of the user's tasks and assignments. You probably don't want to get too carried away, however: Novell will be releasing its own Java-based GroupWise WebAccess client with the next release of GroupWise.

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	VINES, UNIX, Windows NT	1*	NET500E/B	$529	NET500T/B	$599
NETPrint 1000 (external)	NetWare (NDS), UNIX, Windows NT & Apple	3*	NET1000E/N	$419	NET1000T/N	$565
	NetWare, UNIX, Windows NT & LAT	3*	NET1000E/D	$499	NA	
	VINES, NetWare (NDS), UNIX, Windows NT & Apple	3*	NET1000E/B	$649	NET1000T/B	$659
NETPrint 1500 (external)	NetWare (NDS)	5*	NET1500E/N	$639	NET1500T/N	$759
	VINES	5*	NET1500E/B	$829	NET1500T/B	$849
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JETXPrint 10 (internal)	NetWare	MI0	JETS10E/N	$99	NA	
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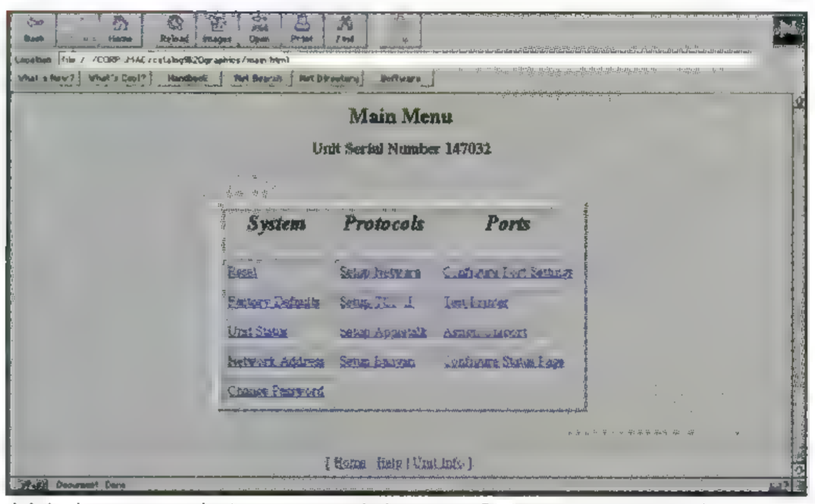

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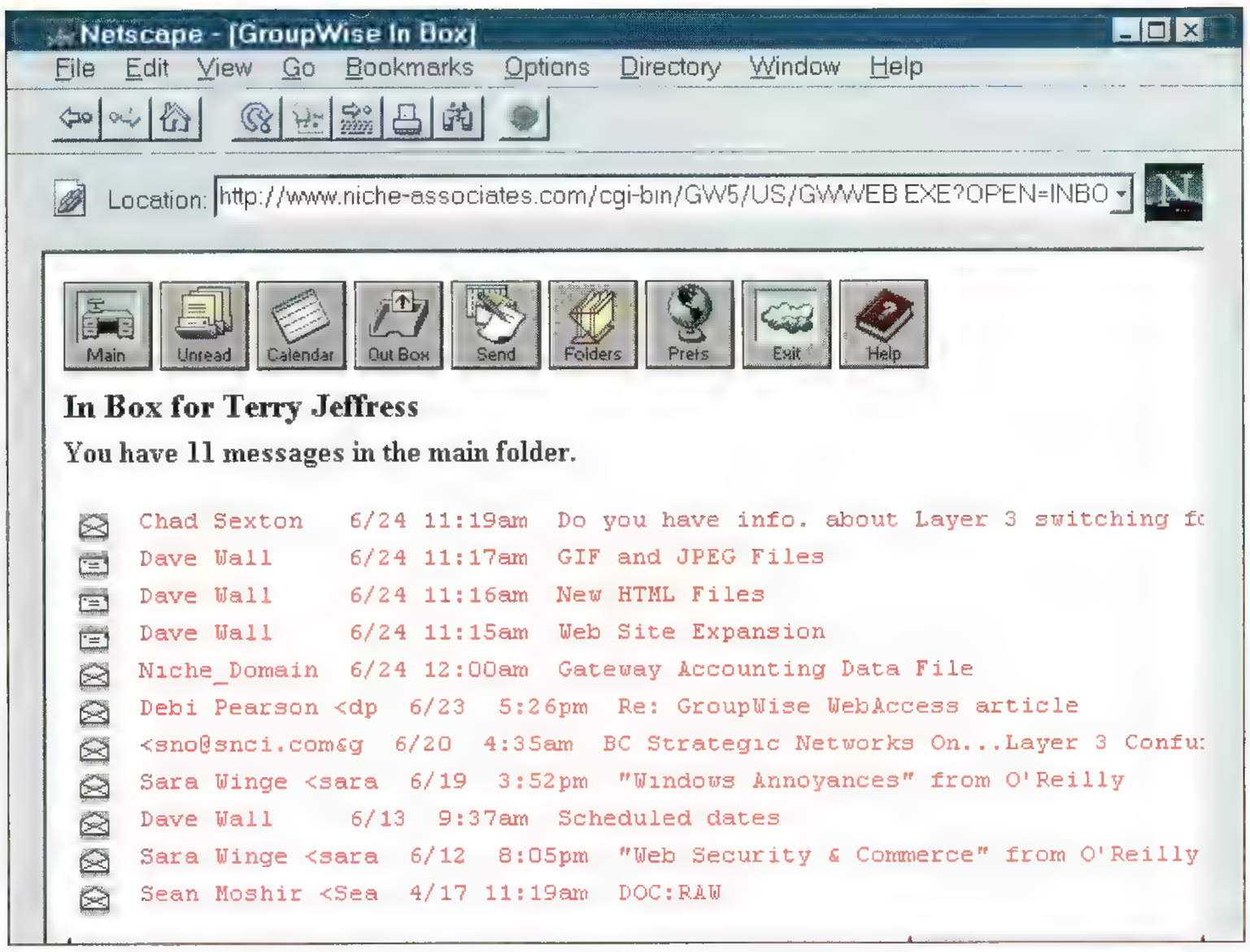

Figure 5. *The GroupWise WebAccess CGI program dynamically creates a new HTML document for each request.*

386- and 486-based computers, you could set up GroupWise WebAccess terminals throughout your office, such as in the lunch room, break room, or lobby.

- Users who have Macintosh or UNIX workstations (which are not yet supported by GroupWise 5) can access your company's GroupWise 5 system through a browser.
- Users who do not have a permanent workstation (such as temporary employees or interns) can access your company's GroupWise 5 system.

These solutions provide access to users within your company's firewall. Whether you choose a one- or two-box solution depends on your available resources and network configuration.

GroupWise WebAccess From the Internet

If your company's network or intranet is connected to the Internet, you can enable users to access their GroupWise 5 universal mailbox from home or from the road. With GroupWise WebAccess, you can grant access to Internet users and still protect your company's intranet: You place your WWW server and the GroupWise WebAccess CGI program outside your company's firewall and place the GroupWise WebAccess Interface inside this firewall. (See Figure 6.)

You then configure the firewall to allow communication to the GroupWise WebAccess Interface only from the GroupWise WebAccess CGI program. Since only the GroupWise WebAccess CGI program can send messages across the firewall, the network inside the firewall remains secure, and users can easily access their GroupWise messages via the Internet.

GroupWise WebAccess From a Branch Office

If you have a branch office, you can use GroupWise WebAccess to enable users at the branch office to easily communicate with users at the main office—without having to install a complete GroupWise 5 system at the branch office. In the following example, the connection between the main office and the branch office can be either a private WAN link or an Internet connection.

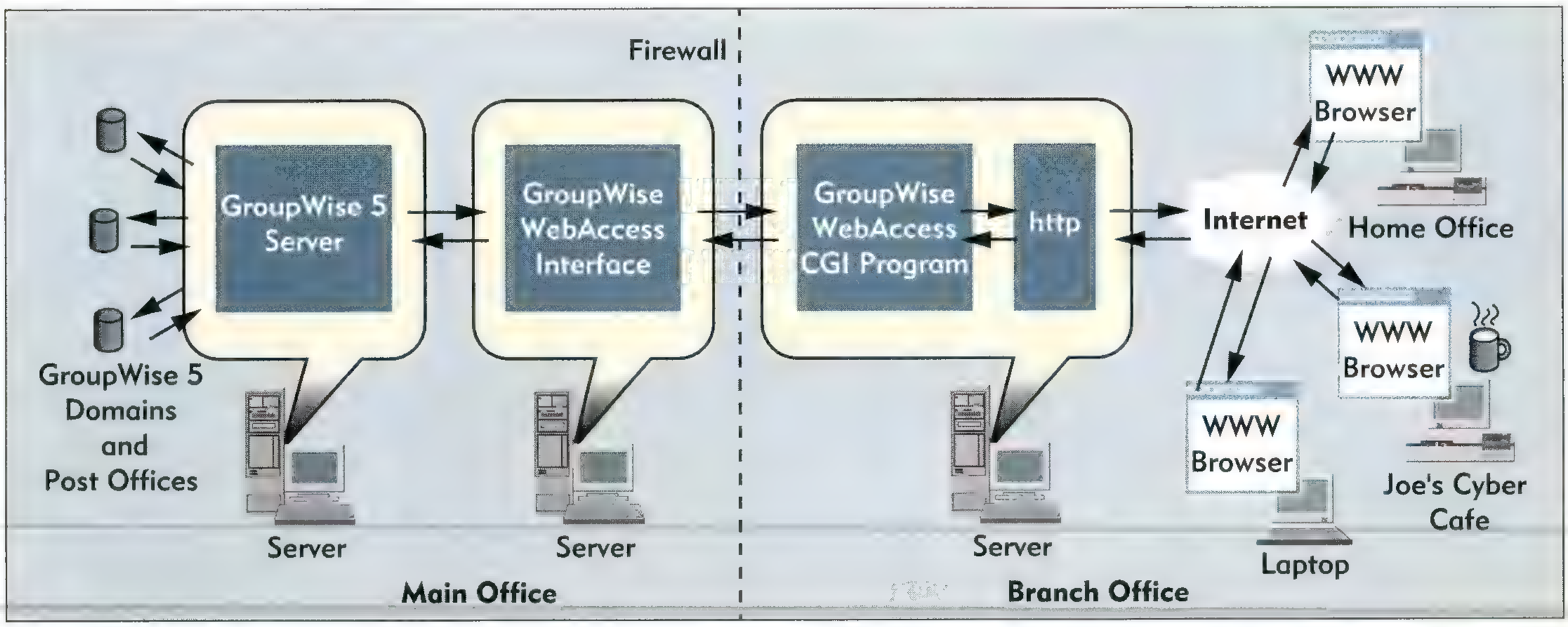

Figure 6. *By placing the GroupWise WebAccess Interface and the GroupWise 5 server inside your company's firewall, you can protect your company's network or intranet from unauthorized access, while providing authorized users with access to their GroupWise 5 universal mailbox from a private WAN link or an Internet connection.*

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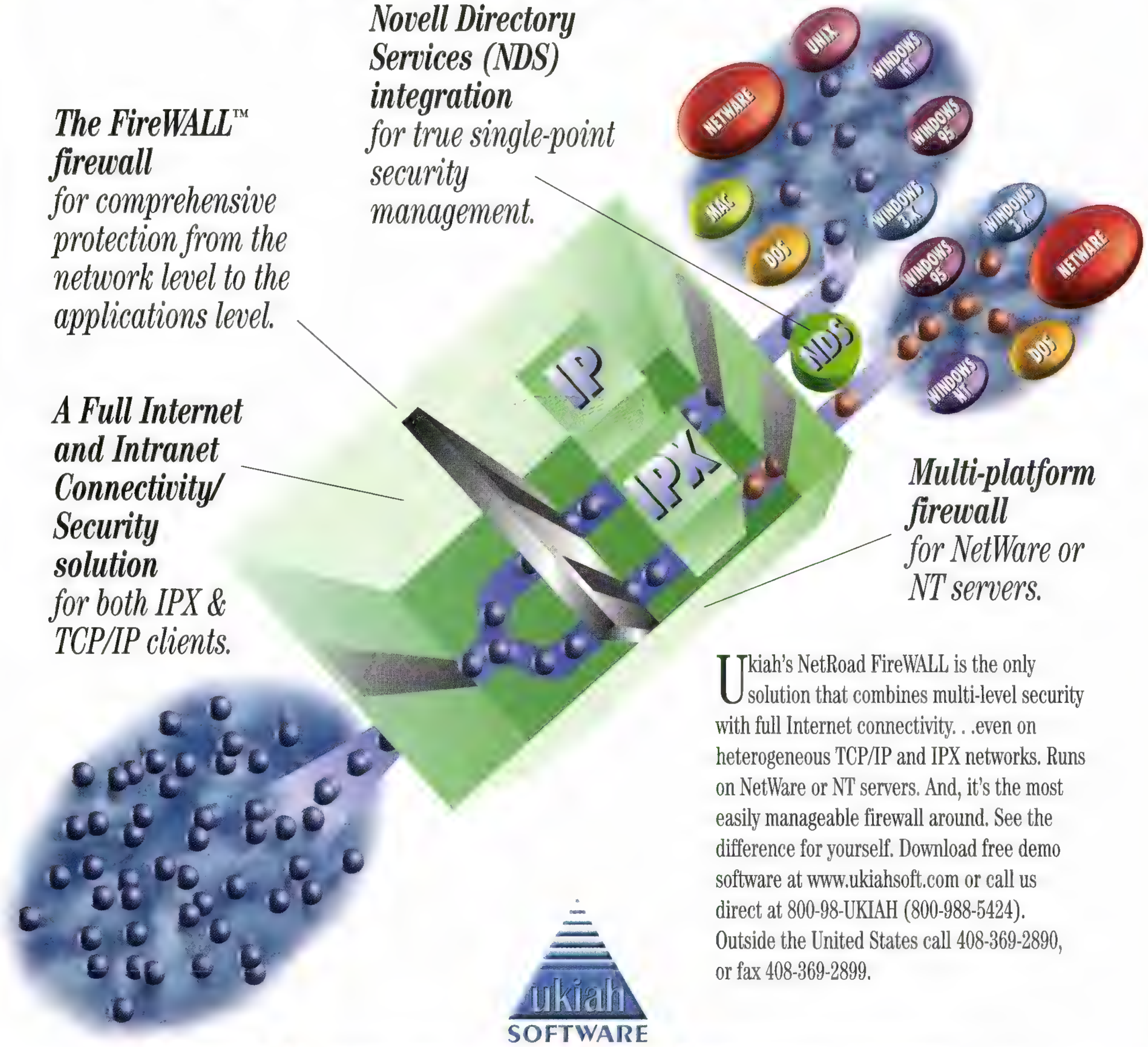

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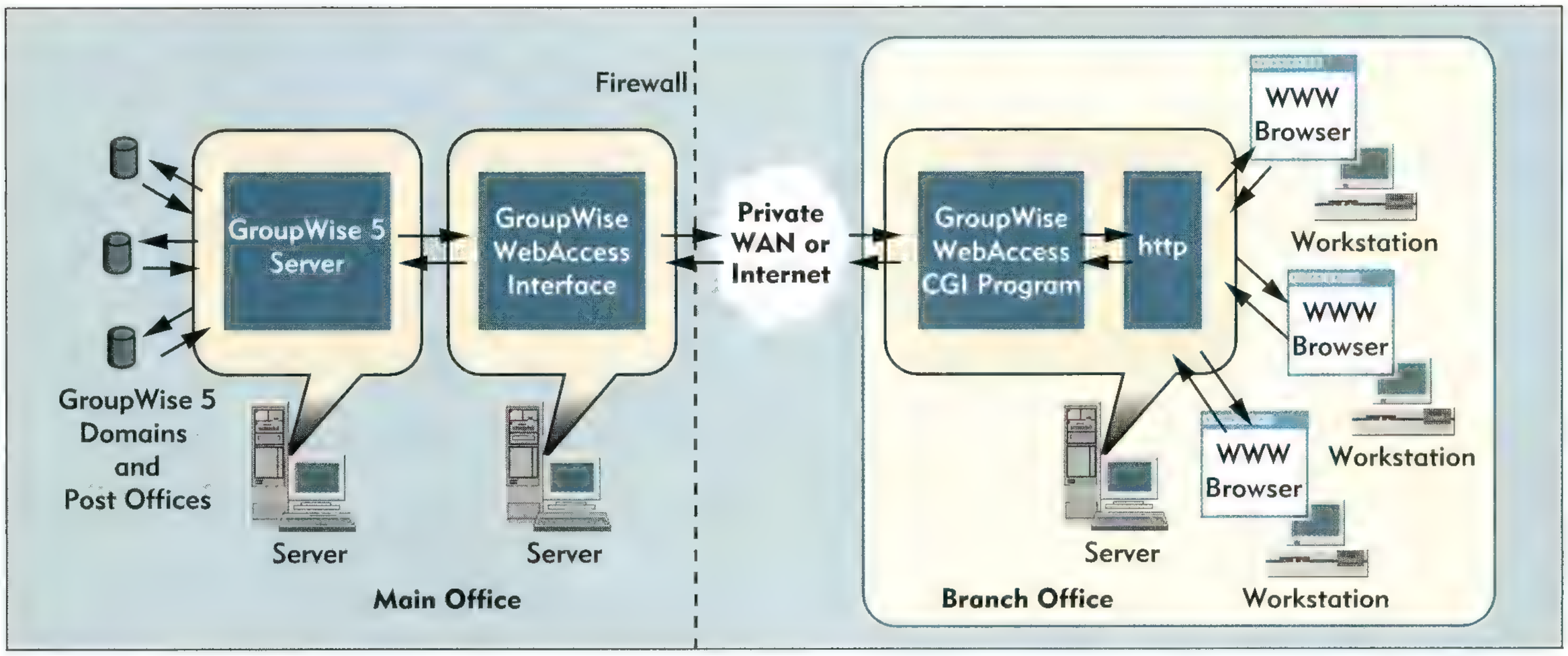

Figure 7. *With GroupWise WebAccess, you can easily provide users at a branch office with access to your company's GroupWise 5 system.*

To configure GroupWise WebAccess for a branch office, you could use a configuration similar to that shown in Figure 7. Users in the branch office could then enter a URL to access the WWW server at the main office. However, this configuration would not be the most efficient use of the bandwidth between the main office and the branch office. As mentioned earlier, the most efficient communication (using the least bandwidth) is between the GroupWise WebAccess CGI program and the GroupWise WebAccess Interface. To take advantage of this efficient communication, you should set up a WWW server at the branch office and install the GroupWise WebAccess CGI program on the same server.

Moving the WWW server to the branch office would accomplish the following things:

- GroupWise WebAccess would use the least amount of bandwidth necessary across the interoffice connection.
- Users at the branch office would experience faster response times because all of the graphics used by GroupWise WebAccess are stored on the local WWW server and do not have to travel across the interoffice connection.
- You could provide GroupWise 5 access for users at multiple branch offices without having to reconfigure the network at the main office (except for configuring the firewall to allow messages from the branch offices into the home office).

Eliminating Bottlenecks on Your GroupWise 5 Configuration

You can also configure several WWW servers to simultaneously use a single GroupWise WebAccess Interface. (See Figure 8.) By default, the GroupWise WebAccess Interface handles only six threads—that is, six simultaneous

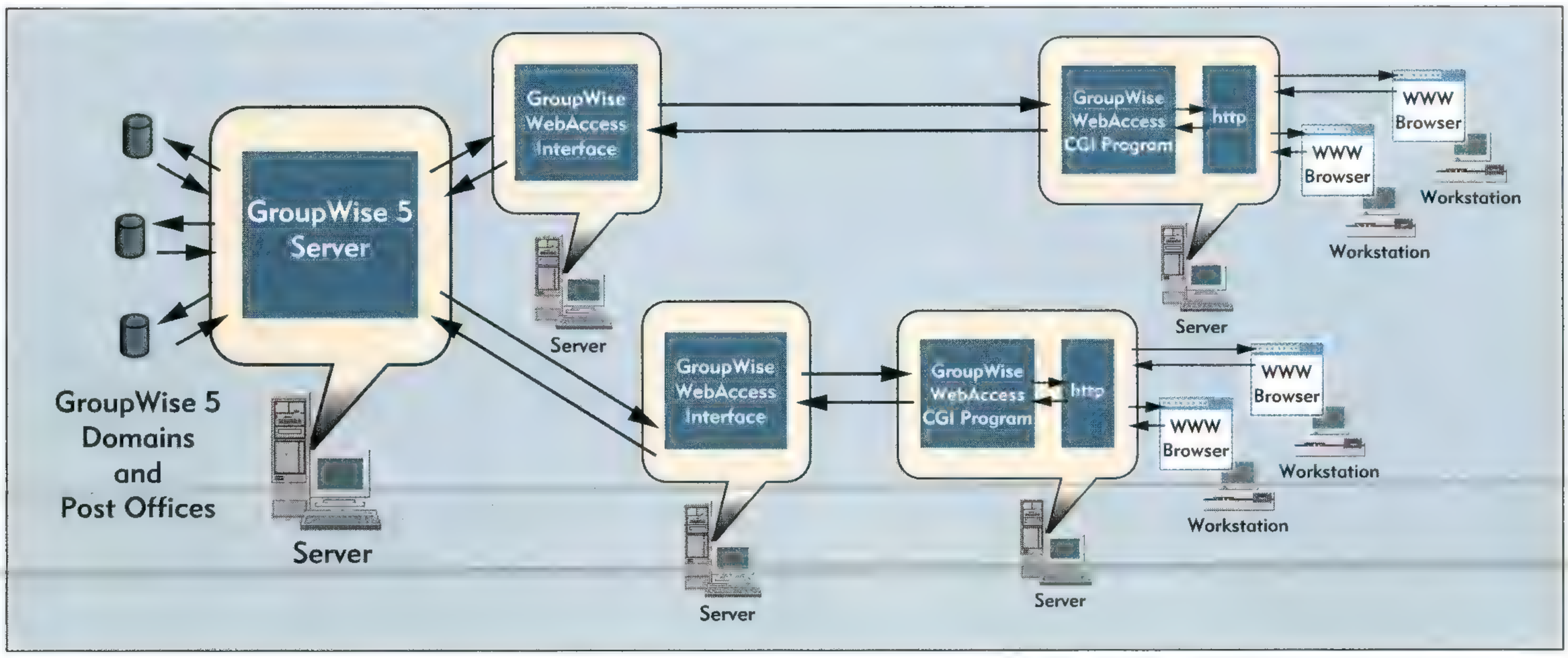

Figure 8. *Multiple GroupWise WebAccess CGI programs can access a single GroupWise WebAccess Interface.*

SecureConsole for NetWare

Is your NetWare console secure?

Your system may not be as secure as you think! With access to the NetWare server console, users can do almost any thing – access user data, trace LAN/main -frame data, change configurations, destroy volumes and much more! Yet natively, the console is unaudited, often accessed through shared passwords and anyone who uses it has full system access – whether their duties need all the privileges or not.

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Installing GroupWise WebAccess

Before you install GroupWise WebAccess, you must first install a GroupWise 5 server, configure a GroupWise 5 domain and post office, and install a World-Wide Web (WWW) server that supports GroupWise WebAccess. (See Figure 1 on p. 8.) You must also configure the servers on which the WWW server and the GroupWise WebAccess Interface will reside to run TCP/IP. If your company's network or intranet meets these requirements, you can install GroupWise WebAccess, which involves three major steps:

1. Install the GroupWise WebAccess software.
2. Create the GroupWise WebAccess gateway.
3. Configure the WWW server.

Because the exact installation procedures vary from one platform to another, this sidebar does not provide step-by-step instructions for installing GroupWise WebAccess. Instead, this sidebar explains the main installation objectives and the decisions you must make at each step.

INSTALLING THE GROUPWISE WEBACCESS SOFTWARE

To install the GroupWise WebAccess software, you run the DOS-based installation program from the GroupWise WebAccess CD-ROM (or from the directory in which you installed the evaluation copy of GroupWise WebAccess). You run this installation program no matter which platforms or configuration options you choose. After running the installation program from a workstation, you must specify the following information:

- The platform on which you want to install the GroupWise WebAccess Interface (IntranetWare, NetWare 4.1 or higher, or Windows NT Server 4.0 or higher)
- The platform on which you want to install the GroupWise WebAccess CGI program (depending on your WWW server, IntranetWare, Sun Solaris 2.3, SunOS 4.13, or Windows NT Server 4.0 or higher)
- The various directories in which you want to install the GroupWise WebAccess software

The installation program then copies all of the necessary files to the appropriate locations on your company's network or intranet.

CREATING THE GROUPWISE WEBACCESS GATEWAY

After you have installed the GroupWise WebAccess software, you must create a gateway in the GroupWise 5 domain database. This gateway enables the GroupWise WebAccess components to communicate with the GroupWise 5 database through a GroupWise 5 server.

You use Novell's NetWare Administrator (NWADMIN) utility to create the GroupWise WebAccess gateway. Creating this gate-way is similar to creating other gateways, with one major exception: You must specify the IP address of the server that will run the GroupWise WebAccess Interface. This IP address tells the GroupWise 5 server how to contact the GroupWise WebAccess Interface.

After you create the GroupWise WebAccess gateway, you can also specify which users can access their GroupWise 5 universal mailbox via GroupWise WebAccess. By default, all GroupWise 5 users have rights to use GroupWise WebAccess. Using the NWADMIN utility, you can grant or deny users, post offices, and domains the rights to access the GroupWise 5 database from GroupWise WebAccess.

CONFIGURING THE WWW SERVER

In addition to creating the GroupWise WebAccess gateway, you must configure the WWW server in the following way to communicate with GroupWise WebAccess:

- You must configure the WWW server to communicate with the GroupWise WebAccess Common Gateway Interface (CGI) program. This step usually involves modifying the WWW server's configuration files to recognize the new CGI program.
- You must ensure that users have an entry point into GroupWise WebAccess. If the WWW server's only function is to provide an entry point for GroupWise WebAccess, the installation program designates the GroupWise WebAccess page as the WWW server's home page. Otherwise, you must create a link from the WWW server's existing home page or another existing page to the GroupWise WebAccess page.

After you install the GroupWise WebAccess software, create the GroupWise WebAccess gateway with the NWADMIN utility, and configure the WWW server, users can access their GroupWise 5 universal mailbox using any browser that supports HyperText Markup Language (HTML) 1.0. ●

requests. However, you can use Novell's NetWare Administrator (NWADMIN) utility to increase the number of threads to 32.

If you increase the number of threads and find that the GroupWise WebAccess Interface is still a bottleneck, you can add more GroupWise WebAccess Interfaces to your network. If you were to add a second GroupWise WebAccess Interface to your company's network or intranet, you would need to reconfigure some GroupWise WebAccess CGI programs to use the new GroupWise WebAccess Interface.

CONCLUSION

GroupWise WebAccess brings users a new dimension of accessibility by allowing them to access their GroupWise universal mailbox from virtually anywhere in the world. In addition, at BrainShare Salt Lake '97, Novell demonstrated a Java-based client for GroupWise WebAccess. This client will make accessing the GroupWise 5 system via a browser easier and will support more of the features now available only with the standard GroupWise 5 client.

You can download a free evaluation copy of GroupWise WebAccess from http://www.novell.com/groupwise/html/webform.html. You can also try GroupWise WebAccess free for 30 days by registering at http://webaccess.novell.com/walogin.html.

For more information about GroupWise WebAccess, visit Novell's WWW site (http://www.novell.com/groupwise/html/webaccess.html). You can also call 1-800-NETWARE or 1-801-861-5588.

Terry L. Jeffress works for Niche Associates, an agency that specializes in writing and editing technical documents. Niche Associates is located in Salt Lake City, Utah. ●

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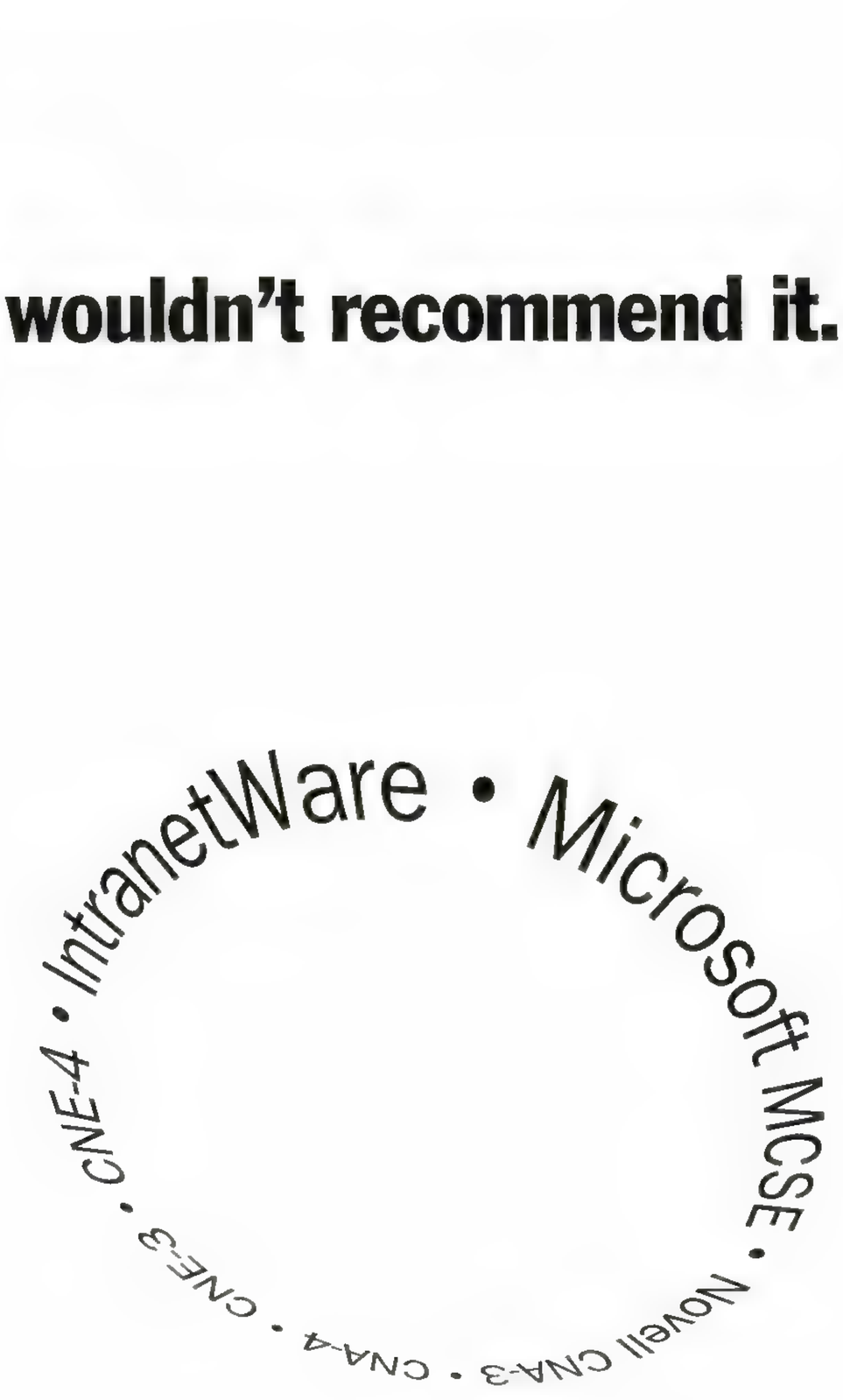

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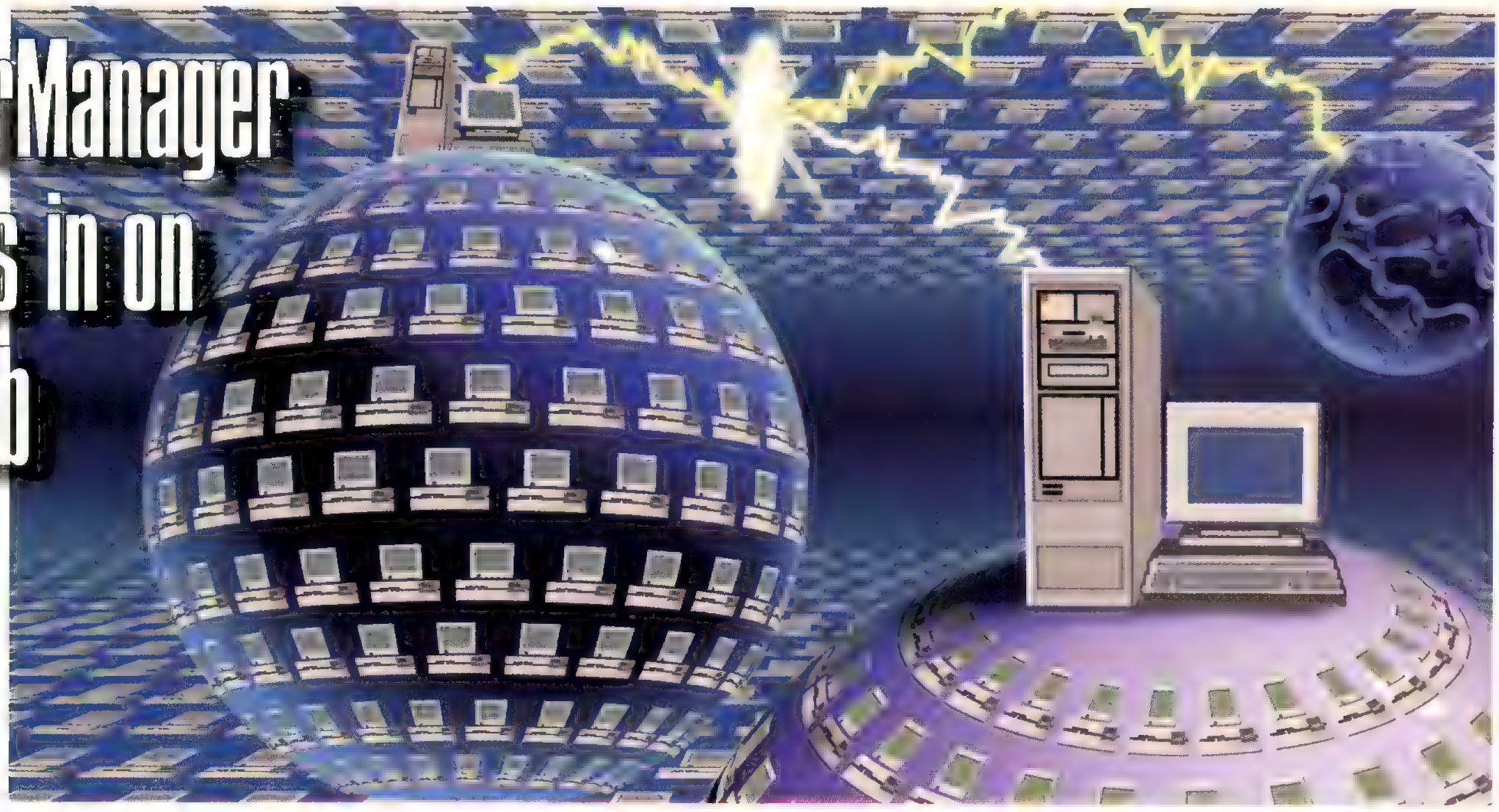
BorderManager Caches in on the Web



Linda Boyer

Accessing the World-Wide Web (WWW)—you know the drill. You click a few buttons to launch your WWW browser and connect to the Internet, you enter the uniform resource locator (URL) for a WWW site—and then you wait. Even if you enter the URL for your company's intranet site, you may wait a considerable amount of time. In fact, if the available bandwidth between your workstation and this intranet site is limited, you might wait as long as (or even longer than) you would wait to access an Internet site.

If you want to speed up access to the WWW and enable users to work more efficiently, Novell has the solution: The proxy included with Novell's new BorderManager (formerly code-named Border Services) significantly reduces the amount of time you spend waiting for WWW files by caching the files that you and other users request. Because this proxy can resolve requests for cached files without having to access the requested Internet or intranet site to retrieve these files, the proxy decreases traffic and increases throughput over your company's Internet and intranet connection. As a result, when you request a file the proxy has not cached, you wait considerably less time than you would wait without this proxy. And when you request a file the proxy has already cached, you wait no longer for that file than you would wait for any other file stored on a local server.

MANY SERVICES IN ONE PRODUCT

Novell's BorderManager, currently available in a beta version and scheduled for release this summer, is a standalone solution for the performance, security, management, and connectivity problems that often occur on an intranet and always occur at the *border*—the point at which your company's network or intranet meets the Internet. Among other components, BorderManager includes an IPX-IP and IP-IP gateway, a virtual private network (VPN) configuration tool, and a proxy. BorderManager also includes a snap-in module for Novell's NetWare Administrator (NWADMIN) utility that enables you to manage all of the BorderManager components using only one utility. (For more information about BorderManager, see "Novell's Border Services," *NetWare Connection*, May 1997, pp. 25–36. You can download this article from http://www.novell.com/nwc/may.97/border57.)

Illustration: John Roberts

The proxy component of BorderManager supports Gopher, FTP, and HyperText Transport Protocol (HTTP) and serves two purposes: The proxy enhances security and accelerates WWW access. To enhance security, the proxy checks the traffic-filtering rules you have configured to determine what types of WWW traffic are authorized before relaying that traffic between clients and public or private servers.

You can use the BorderManager snap-in module for the NWADMIN utility to configure traffic-filtering rules for individual users or groups of users. By configuring these rules, you can restrict users' access to entire sites or to individual pages during particular times of day. For example, you could configure a rule that would prevent members of the Everyone group from accessing sports-related WWW sites during business hours.

In addition to providing security services, the proxy component of BorderManager performs passive caching, reverse caching, or both. When configured to perform *passive caching* (also called *normal caching*), the proxy stores WWW files that users request from external WWW servers (assuming that you have configured users' browsers to use the proxy for WWW access). For example, if a user requested a file that resides on a WWW server on the Internet, the user's browser would send the request to the proxy. Upon receiving this request, the proxy would check its own cache. If the file were not in cache, the proxy would forward the request either to a proxy on another server (if you had configured it to do so) or to the file's source WWW server on the Internet.

After receiving the file, the proxy would store a copy of this file in cache before returning the file to the user's browser. If the file were already in cache, the proxy would return this file directly to the user's browser—without sending a request over Internet or intranet lines.

When configured to perform *reverse caching* (also called *HTTP acceleration*), the proxy component of BorderManager stores WWW files that users outside your company's network or intranet request from internal WWW servers. For example, if an Internet user requested a file that resides on your company's WWW server, the proxy would first check its own cache. If the file were not in cache, the proxy would forward the request to your company's WWW server, which would send the file to the proxy

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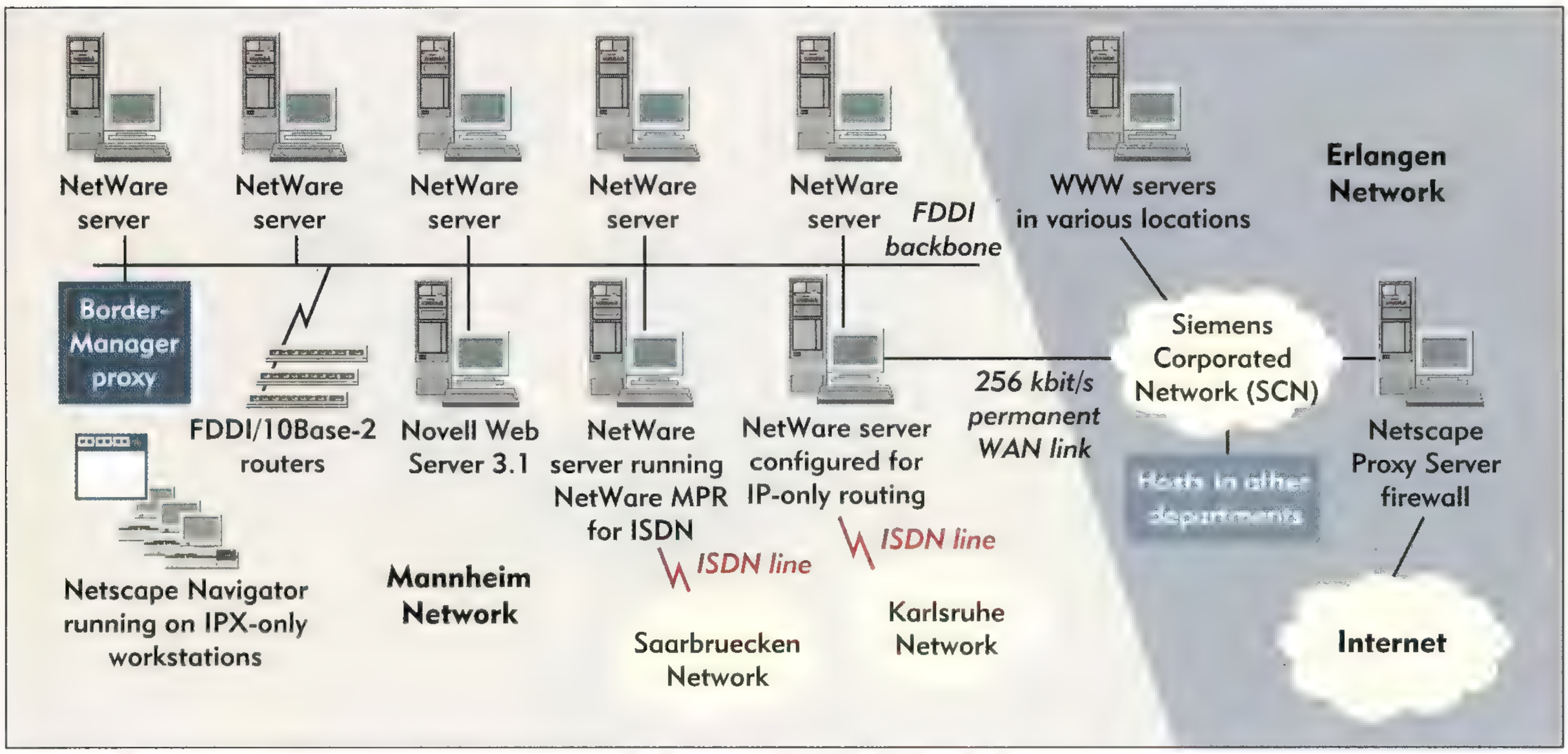

Figure 1. *After installing BorderManager, Ralf reconfigured users' browsers to send requests to the proxy component of BorderManager—thereby significantly reducing WAN traffic.*

component of BorderManager. The proxy would store a copy of the file in cache and send this file to the user's browser. If the file were in cache, the proxy would send this file directly to the user's browser—without forwarding the request to your company's WWW server and consuming network or intranet bandwidth.

THE PERFECT CANDIDATE

Sounds great, doesn't it? Ralf Probst thought so. Ralf is a network administrator at Siemens, a world leader in electrical engineering and one of the largest companies in Germany (second only to Mercedes-Benz). Ralf works for Siemens' Technical System Services (TD) in Mannheim, Germany. TD is one of several departments within the Industrial and Building Systems Group (ANL), which is one of Siemens' 14 business units. TD provides technical services for Siemens' customers and business units and also helps Siemens' customers design networks, installs and assembles products, and develops software.

In December 1996, Ralf read about the proxy component of BorderManager on Novell's WWW site at http://www.novell.com and registered immediately for the Early Access Release CD-ROM. This CD-ROM included a pre-alpha version of BorderManager. Although Ralf was interested in several BorderManager components, he was particularly interested in the proxy component.

As Ralf explains in an e-mail message that he sent to Novell shortly after receiving the Early Access Release CD-ROM, the proxy component of BorderManager will ease TD's "daily struggle with rather slow intranet-WAN links. This is exactly the product [TD] desperately needs."

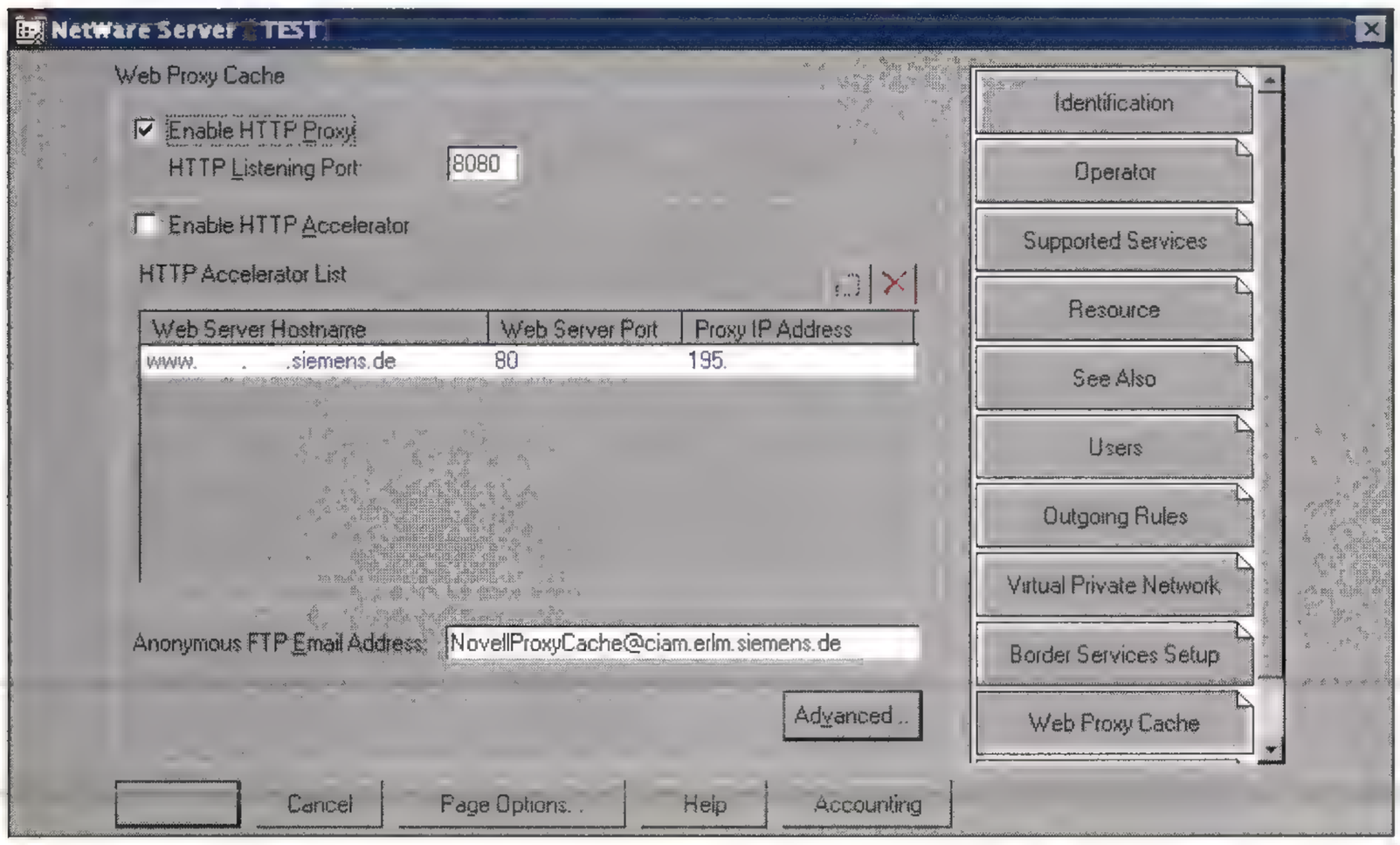

Figure 2. *To use the passive caching capabilities of BorderManager, Ralf accessed the Web Proxy Cache screen in the NWADMIN utility and selected the Enable HTTP Proxy option.*

The Network Situation

Ralf and two other members of a nine-member team run the TD network—one of the largest independently managed networks within Siemens. The network's 35 servers and approximately 500 IPX clients span three physical sites—Mannheim, Saarbruecken, and Karlsruhe. To connect these sites, TD uses versions 2.11 and 3.1 of NetWare MultiProtocol Router (MPR) for ISDN by AVM and Novell.

Approximately 20 of the servers on the TD network run NetWare 4.11 or 4.1; the remaining servers run NetWare 3.12. The

servers also run several NetWare Loadable Modules (NLMs) from Novell and third-party companies, such as the following:

- Servers COM and MEX (in Mannheim), KHE_COM (in Karlsruhe), and SBN_COM (in Saarbruecken) run NetWare MPR for ISDN.
- Server AIM (in Mannheim) runs the Novell Web Server 3.1 and IPX-IP gateway components of BorderManager and Quarterdeck's IWare Connect (another IPX-IP gateway).
- Server MOM (in Mannheim) runs Novell's GroupWise 5.
- Server BUP (in Mannheim) runs Cheyenne Software's ARCserve 6 for NetWare.
- Other servers run NLMs for printing, faxing, and virus protection.

The TD network serves a variety of needs: Of the 700 users at TD, approximately 50 percent use the TD network to access fax capabilities, a word-processing application, a spreadsheet application, an e-mail application, and other applications. Approximately 40 percent of these users use the TD network as a platform for both hardware and software development, and other users use the TD network to document their projects (by creating and storing drawings of electrical wiring diagrams, for example). However, virtually all of the users share one reason for using the TD network: According to Ralf, approximately 90 percent of these users use the TD network to access the Internet and Siemens' intranet over Siemens Corporated Network (SCN), the infrastructure that connects Siemens' offices worldwide.

The Internet/Intranet Connection

Before installing BorderManager, Ralf had configured the Netscape Navigator browsers running on TD's workstations to use Netscape Proxy Server to access the Internet and Siemens' intranet. Netscape Proxy Server is located at Siemens' main office in Erlangen, about 190 miles east of Mannheim. (See Figure 1.)

TD has only one server with a valid routing entry to Netscape Proxy Server: the AIM server in Mannheim. A permanent 256 kbit/s WAN link (part of SCN) connects this server and Netscape Proxy Server. TD shares this link with other Siemens' departments in its building.

The link is extremely busy, serving as the transport medium for requests and replies to and from internal and external WWW servers. The link also provides access to Siemens' BS2000 mainframe applications and handles file transfers between hosts, online connections with strategic business partners, and e-mail traffic.

As you can imagine, connecting to WWW sites over only a portion of a low-bandwidth WAN link is a hassle. "During normal office hours, the link becomes very slow," Ralf says. "Getting data over this link can be a horrible experience."

Although establishing another routing entry to Netscape Proxy Server would improve response time, Ralf would rather use another solution. Establishing a routing entry, Ralf explains, requires a lot of paperwork and a number of telephone calls ("you cannot imagine how many," Ralf says) and takes as long as two weeks.

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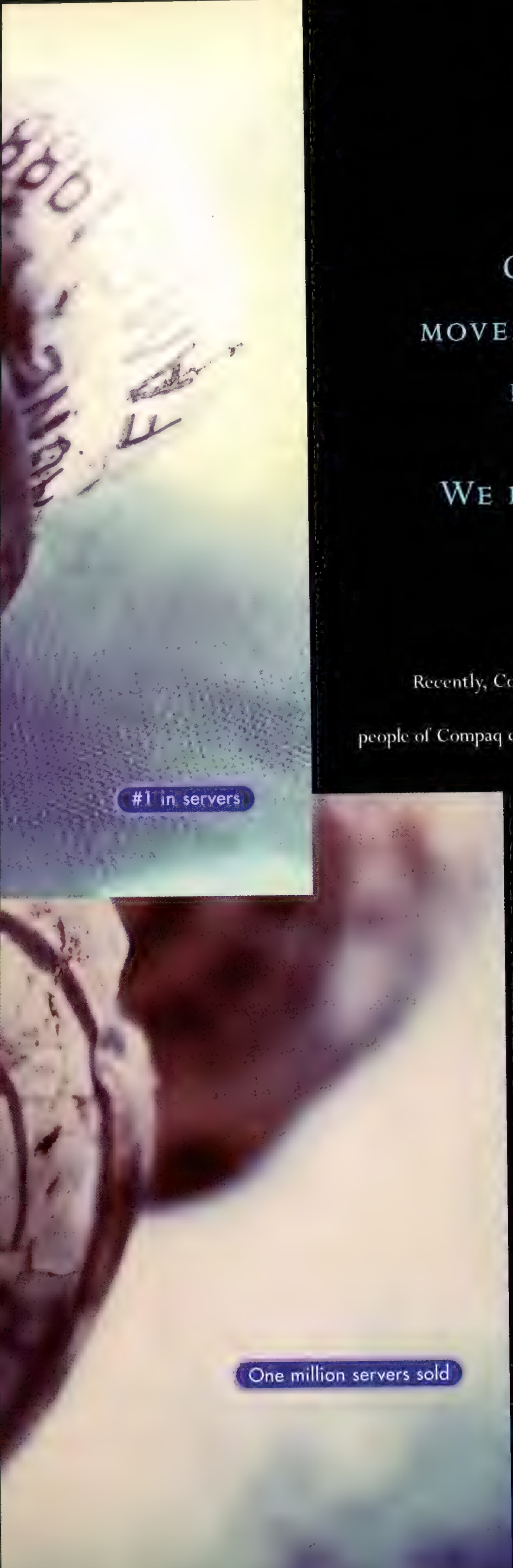

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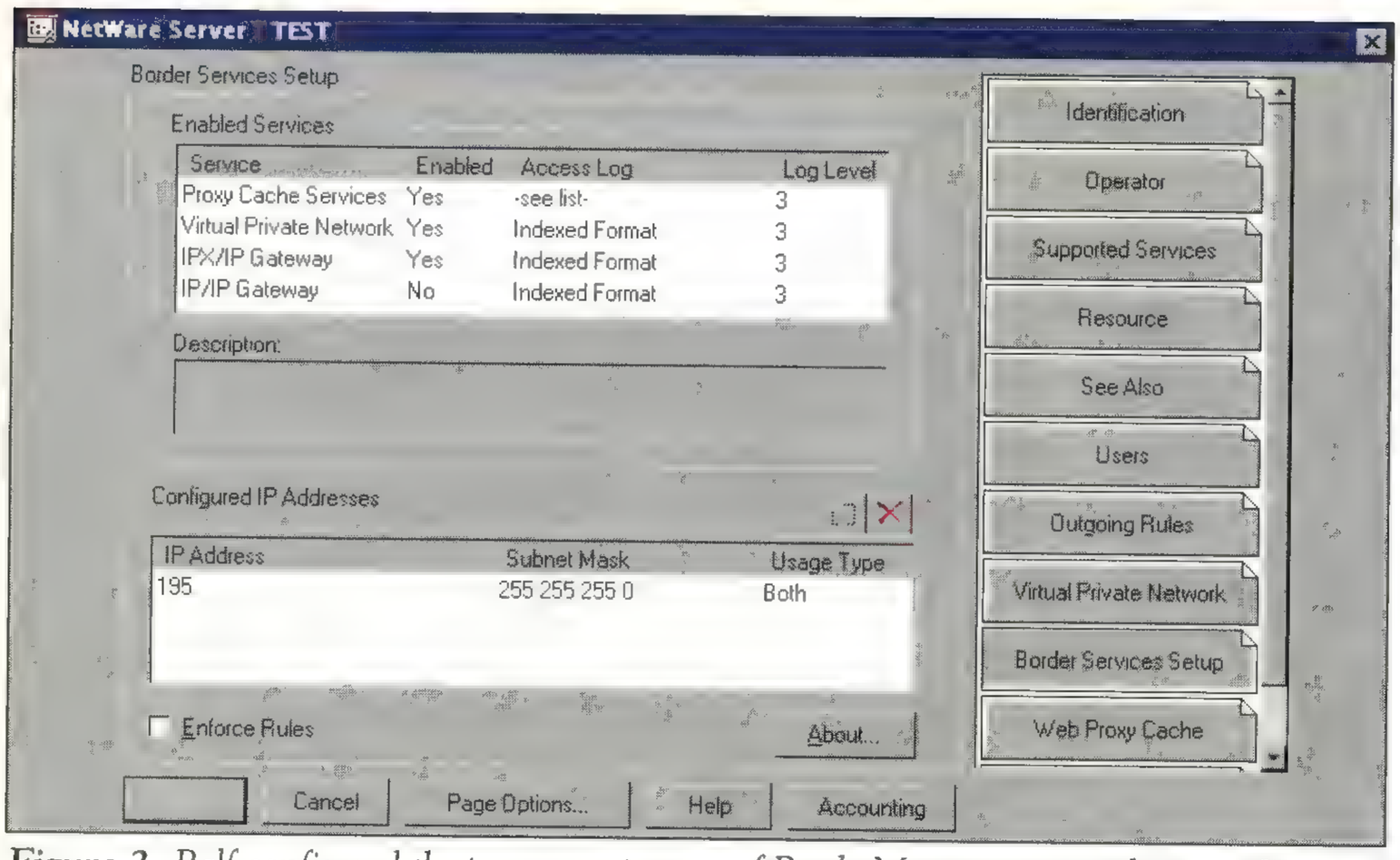

Figure 3. *Ralf configured the proxy component of BorderManager to use the same IP address for both public and private use.*

Ralf knew that redundant requests for WWW files generate a lot of traffic—more traffic than TD's slow WAN link can handle efficiently. To accelerate users' access to the WWW, Ralf began looking for a solution that would eliminate some of the traffic created by redundant requests.

INSTALLING BORDERMANAGER

Because Ralf has always been satisfied with Novell products, he turned to Novell for a solution to his problem—and found this solution in BorderManager. "Every other Novell product we have bought and tested has worked to our full satisfaction," Ralf says. "We presumed that BorderManager would be no exception." Ralf's presumption proved to be valid.

Ralf installed the pre-alpha version of BorderManager that was on the Early Access Release CD-ROM, but he had a few problems with the proxy component of BorderManager (a not uncommon occurrence in a pre-alpha version). As a result, Ralf requested and received the beta version of BorderManager, which he installed on a test server running IntranetWare. The test server is equipped with a 200 MHz Pentium processor, 128 MB of RAM, a 1 GB hard drive, and one network interface board. This board is connected to a Fiber Distributed Data Interface (FDDI) backbone on the TD network.

To begin the installation process, Ralf loaded the INSTALL.NLM at the test server console and selected the appropriate options (for example, the Install a Product Not Listed option from the Product Options menu). The INSTALL NLM copied the NLMs needed to run and configure the BorderManager components, including the Novell Proxy Server NLM (PROXY.NLM) and the Novell Proxy Configuration NLM (PROXYCFG.NLM).

Next, Ralf ran the BorderManager SETUP.EXE file from a Windows 95 workstation. This file copied the BorderManager snap-in module for the NWADMIN utility to the SYS:PUBLIC\WIN95 directory on the IntranetWare server. The file also modified the Windows 95 registry to make use of this snap-in module.

SETTING UP THE PROXY COMPONENT OF BORDERMANAGER

To configure the proxy component of BorderManager to perform passive caching, Ralf enabled this proxy by clicking the Enable HTTP Proxy option on the Web Proxy Cache screen in the NWADMIN utility. (See Figure 2 on p. 24.) Ralf also completed the following steps:

1. Configured BorderManager's public and private IP addresses
2. Configured users' browsers to use the proxy component of BorderManager
3. Configured the proxy component of BorderManager to communicate with Netscape Proxy Server

Configuring IP Addresses

BorderManager uses the IP addresses bound to both the server's private network interface board (the one that attaches the proxy to your company's network or intranet) and the server's public network interface board (the one that attaches the proxy to the Internet). Browsers on your company's network or intranet access the proxy component of BorderManager using the private IP address, which does not have to be a registered IP address. The proxy sends and receives packets to and from external WWW servers using the public IP address, which must be a registered IP address. The source address on all IP packets that leave the proxy—regardless of their actual point of origin—is the proxy's public IP address.

Because Ralf installed BorderManager on a server with only one network interface board, he needed to configure the same IP address for both public and private use. On the BorderManager Setup screen in the NWADMIN utility, Ralf specified that BorderManager's IP address (the IP address bound to the FDDI network interface board) was for both public and private use. (See Figure 3.)

Configuring Browsers

After specifying BorderManager's IP address, Ralf configured users' browsers to use the proxy component of BorderManager to access all internal and external WWW servers except server AIM, a local WWW server. To configure these browsers, Ralf launched Netscape Navigator, selected the Network Preferences option from the Options menu, and selected the Proxies option. Next, he selected the Manual Proxy Configuration option and clicked View.

Ralf then completed the FTP Proxy, Gopher Proxy, and HTTP Proxy fields by entering the proxy's host name and the port number (8080) that users' browsers use to access this proxy. In the No Proxy field, Ralf entered the AIM server's host name. As a result, requests for WWW files on the AIM server are sent directly to this server rather than to the proxy component of BorderManager.

Configuring Communications

Finally, Ralf needed to configure the proxy component of BorderManager to communicate with Netscape Proxy Server—users' single point of access to the Internet and Siemens' intranet. Although configuring the proxy to communicate with Netscape Proxy Server is a relatively simple process, the technology that makes this communication possible is quite complex. (See the "Configuring the Neighborhood" section on p. 30.)

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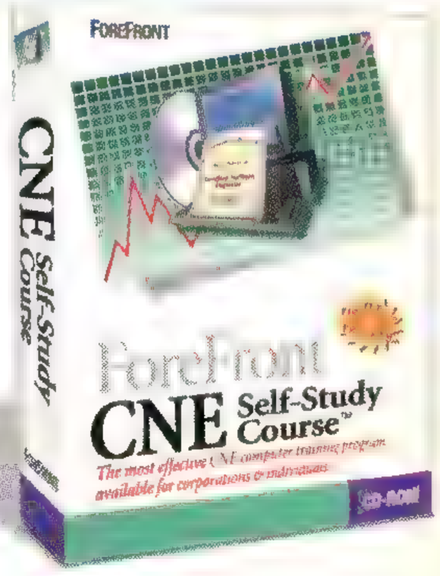

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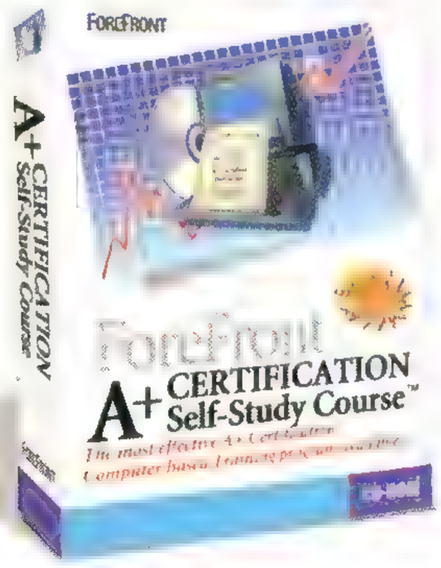

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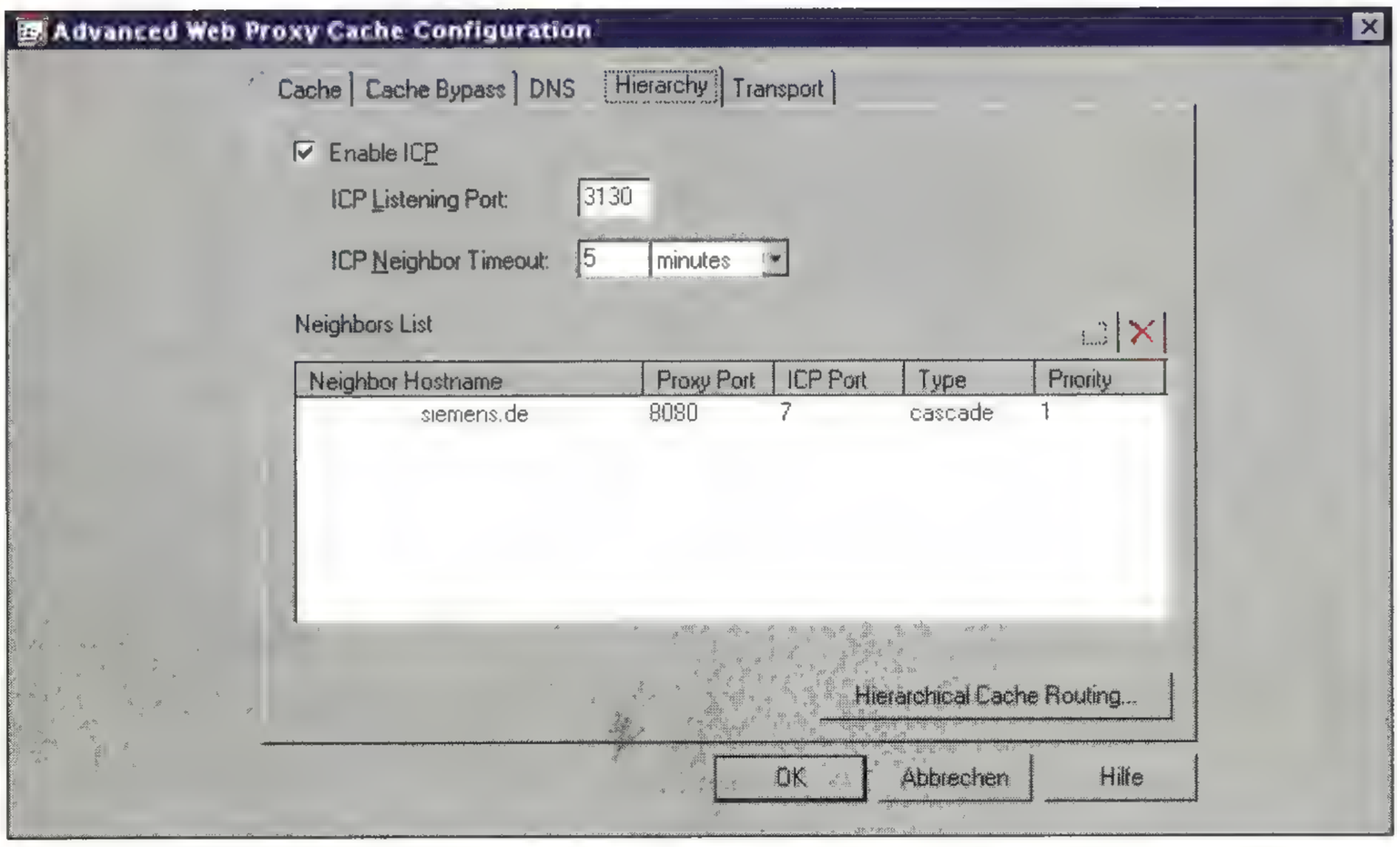

Figure 4. *To enable the proxy component of Border Manager to communicate with Netscape Proxy Server, Ralf had to configure the proxy's neighborhood.*

CERN Versus Harvest-Squid. Netscape Proxy Server and the proxy component of BorderManager use different caching technologies. Netscape Proxy Server is based on CERN, the first-generation caching technology developed by the European Laboratory for Particle Physics. The proxy component of BorderManager, on the other hand, is based on Harvest-Squid, a second-generation caching technology. The original Harvest caching project was jointly developed by the University of Colorado and the University of Southern California. This project was later transferred to the National Laboratory for Advanced Network Research (NLANR), and the technology was renamed Squid.

One of the differences between a CERN proxy and a Harvest-Squid proxy is the extent to which each proxy can use the cache on other proxy servers. If you configure a CERN proxy to use another proxy's cache, the CERN proxy forwards requests to the other cache without first verifying whether this cache is functioning. However, if you configure a Harvest-Squid proxy to use another proxy's cache, the Harvest-Squid proxy sends a query to the other proxy to verify that it is functioning before forwarding the request.

Internet Caching Protocol. To locate WWW files stored in another proxy's cache, a Harvest-Squid proxy uses the Internet Caching Protocol (ICP). CERN proxies such as Netscape Proxy Server, on the other hand, do not use or understand ICP. To understand how ICP works, suppose that you configured PROXY-A to communicate with other proxies, which would then be called *neighbors*. Further suppose that PROXY-A and its neighbors, PROXY-B and PROXY-C, were based on the Harvest-Squid technology.

When PROXY-A received a request for a WWW file that PROXY-A did not have in its own cache, it would send an ICP query to PROXY-B and PROXY-C. Assuming that both proxies responded to the query (indicating that they are functioning), PROXY-A would forward the request for the file to PROXY-B and PROXY-C. These proxies would then return an ICP packet indicating a hit ("I have the file") or a miss ("I don't have the file").

If both PROXY-B and PROXY-C had the WWW file, PROXY-A would retrieve this file from whichever neighbor returned the first HIT packet. If neither PROXY-B nor PROXY-C had the file, either PROXY-A would retrieve this file from the file's source server, or PROXY-B or PROXY-C would retrieve the file on behalf of PROXY-A, depending on how you had configured PROXY-A.

Parent, Peer, and Cascade Neighbors. You can configure the proxy component of BorderManager to communicate with three types of neighbors:

- Parent neighbors
- Peer neighbors
- Cascade neighbors

You can configure only other BorderManager or Harvest-Squid proxies as *parent neighbors* or *peer neighbors* to a BorderManager proxy. When a parent neighbor receives a request for a WWW file, the parent neighbor checks its own cache. If the parent neighbor has the file in cache, this neighbor returns the file to the BorderManager proxy. If the parent neighbor does not have the file, this neighbor retrieves the file from the file's source server.

When a peer neighbor receives a request for a WWW file, the peer neighbor also checks its own cache. However, if the peer neighbor does not have the file, this neighbor responds only with a MISS packet. A peer neighbor will not retrieve a file from the file's source server.

For example, suppose that PROXY-B were a parent neighbor to PROXY-A and PROXY-C were a peer neighbor to PROXY-A. If PROXY-A sent PROXY-B and PROXY-C a request for a WWW file and neither neighbor had the file in its own cache, PROXY-C would return a MISS packet, and PROXY-B would retrieve the file from the file's source server and return this file to PROXY-A.

You can configure CERN proxies only as *Cascade neighbors* to the proxy component of BorderManager. Like a parent neighbor, a Cascade neighbor can retrieve a WWW file from the file's source server if the Cascade neighbor does not have the file in its own cache.

Configuring the Neighborhood. To communicate with Netscape Proxy Server, the proxy component of BorderManager needed rights to access Netscape Proxy Server. After these rights were granted, Ralf enabled the proxy's ICP, specified that the proxy had one neighbor, and indicated the neighbor's host name, type, and ICP port number by completing several steps:

1. Ralf clicked the Advanced . . . button on the Web Proxy Cache screen in the NWADMIN utility.
2. From the Advanced . . . menu, Ralf selected each of the tabs that enabled him to configure Advanced options for the proxy component of BorderManager. For example, these options allow you to configure the directory in which the proxy should cache data, the maximum size of cached files, the time-to-live value for cached files, and which URLs should not be cached. Ralf accepted the default values for most of the Advanced options. He then selected the Hierarchy tab to access the Neighbors list, which allowed him to configure the proxy's neighborhood. (See Figure 4.)

3. In the Neighbors list, Ralf specified that the proxy had only one neighbor, which was a Cascade neighbor. (As mentioned earlier, Netscape Proxy Server is a CERN proxy, which can be configured only as a Cascade neighbor.) Ralf also specified the host name and ICP port number that the proxy component of BorderManager should use to access Netscape Proxy Server.
4. Ralf set Netscape Proxy Server's ICP port number to 7, a User Datagram Protocol (UDP) echo port. As a CERN proxy, Netscape Proxy Server cannot use or understand ICP. To compensate for this inherent weakness in CERN proxies, you must direct the proxy component of BorderManager to use the UDP echo port to access Cascade neighbors. Then when the proxy sends an ICP query to a Cascade neighbor, that neighbor's UDP echo port echoes the query, tricking the proxy into believing that it received a response.

For example, suppose that a user on the TD network sent the proxy component of BorderManager a request for a WWW file. If this file were not in the proxy's cache, the proxy would send an ICP query to Netscape Proxy Server's UDP echo port, which would echo the query. When the proxy received the echo, this proxy would believe that it had received a response and would determine that the Cascade neighbor was functioning. The proxy would then forward the request to Netscape Proxy Server, which would check its own cache for the file. If the file were in cache, Netscape Proxy Server would return this file. If the file were not in cache, however, Netscape Proxy Server would retrieve this file from the file's source server (just as any other parent or Cascade neighbor would do).

THE PROVERBIAL HITCH

Although installing and configuring the beta version of BorderManager was relatively painless, this process did have the proverbial hitch. While Ralf was able to get the proxy component of BorderManager to resolve Domain Name System (DNS) names for hosts on Siemens' intranet, he was unable to get the proxy to resolve DNS names for Internet hosts.

The TD network does not have its own DNS server. Without a DNS server, the proxy component of BorderManager relies on DNS servers on the Erlangen network to resolve DNS names of Internet and intranet hosts. Netscape Proxy Server on the Erlangen network resolves the DNS names of intranet hosts. Because the TD network has a routing entry to Netscape Proxy Server, the proxy component of BorderManager can resolve DNS names of intranet hosts.

However, to resolve DNS names of Internet hosts, Netscape Proxy Server consults another DNS server—a server to which the TD network does not have a routing entry. Therefore, the proxy component of BorderManager cannot resolve DNS names of Internet hosts.

To enable the proxy component of BorderManager to resolve DNS names of Internet hosts, Ralf has two choices: He can install a DNS server on the TD network, or he can establish a routing entry to the DNS server on the Erlangen network that resolves DNS names of Internet hosts. Ralf would rather set up a DNS server on the TD network than establish another routing entry, but at this point, he does not know what the TD networking team will do. However, Ralf will implement one of these solutions before he installs BorderManager on his live network.

THE PLAN, THE PLAN!

Ralf plans to install BorderManager on server AIM after BorderManager is released later this summer. Ralf then plans to enable both passive and reverse caching to reduce traffic on the WAN link between the TD and Erlangen networks.

Reverse caching will also enable Ralf to install as many Novell Web Servers on his network as he wants—without having to establish routing entries for each server. "The goal," Ralf explains, "is to let the outside world know only about our proxy, no matter how many WWW servers we have physically." Thus, if a user on Siemens' intranet outside the TD network requests information stored on one of TD's WWW servers, BorderManager will service that request—reducing traffic on the TD network and sparing Ralf the inconvenience of establishing routing entries for each WWW server he installs.

Linda Boyer works for Niche Associates, which specializes in technical writing.

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Circle 117 on the reader service card.

Laura Chappell

Preserving WAN Bandwidth

As you expand your company's network to include more servers, workstations, and WAN links, network performance can become a problem. To ensure that you are not wasting bandwidth, you should examine the type of communications that are being sent across the network. For example, if your company's network includes a dial-on-demand WAN link, such as an Integrated Services Digital Network (ISDN) line between two offices, you need to eliminate unnecessary communications that initiate this WAN link.

Because IntranetWare and NetWare devices perform several processes to maintain connectivity, these devices may be sending unnecessary communications over your company's WAN link. This article examines how processes such as NetWare serialization, NetWare Core Protocol (NCP) watchdog, SPX keep-alive, and queue sampling affect a WAN link. This article then explains how to prevent these processes from creating network traffic across a WAN link.

NETWARE SERIALIZATION

Like many products, IntranetWare, NetWare 4, and NetWare 3 use a serialization process to detect copyright violations. Approximately every 66 seconds, each IntranetWare or NetWare server sends five serialization packets to other IntranetWare or NetWare servers on the network. These serialization packets are IPX packets that are addressed to serialization socket 0x0457 and contain the serial number of the transmitting server. (See Figure 1.) Although serialization packets provide only copy-protection information, they can consume bandwidth on your WAN link. If your company has a dial-on-demand WAN link, serialization packets can even establish this link between two servers.

Despite what you may have heard, you can use routers on each side of the WAN link to filter out serialization packets without affecting the way IntranetWare and NetWare servers communicate. In fact, many routers, such as Novell's NetWare MultiProtocol Router (MPR) 3.1, filter out serialization packets across a dial-on-demand WAN link by default.

NCP WATCHDOG

When you log in to an IntranetWare or NetWare server, the server begins to monitor your workstation's connection for activity. If you log out of a server, the Novell client on your workstation sends a Destroy Connection NCP request to the server, which clears your workstation's connection ID number. If you simply turn off your workstation without logging out of the network, however, the Novell client on your workstation cannot send a Destroy Connection NCP request to the server. As a result, the server does not clear your workstation's connection ID number.

IntranetWare and NetWare use the NCP watchdog process to identify and terminate invalid connections. If you log in to a server and do not communicate with this server within a specified amount of time, the server sends your workstation an NCP watchdog request to determine if your workstation's connection is still valid. (See Figure 2 on p. 34.)

If the Novell client is loaded on your workstation, this client sends an NCP watchdog reply to ensure that the server does not clear your workstation's connection. If the Novell client on your workstation does not send an NCP watchdog reply (because you shut off your workstation, for example), the server sends another NCP watchdog request. The server repeats this process the number of times specified by the Number of Watchdog Packets SET parameter. After reaching this number, the server assumes that the workstation's connection is invalid and clears the connection.

By default, an IntranetWare or NetWare server sends an NCP watchdog request after your workstation's connection has been inactive for five minutes. If your company has a dial-on-demand WAN link and no user is accessing this link, you certainly don't want the NCP watchdog process to establish this link because the connection has been idle five minutes.

To avoid establishing a WAN link for the sole purpose of sending and receiving NCP watchdog packets, some routers perform NCP watchdog spoofing: If the server and your

Illustration: John Roberts

workstation are separated by a dial-on-demand WAN link, the local router replies to the NCP watchdog request on behalf of your workstation. As a result, a WAN link is not established. NetWare MPR 3.1 provides an NCP watchdog spoofing option, and Cisco's IOS software includes an IPX watchdog spoofing command that performs the same function.

Because these routers perform NCP watchdog spoofing, your workstation's connection remains intact unless you log out of the network. If you want to periodically clear connections on your server, you can have this server force every workstation to log out at a predetermined time, such as 9 p.m. In this way, all connections are available the next day.

If you do not have a router that performs NCP watchdog spoofing, you can reduce the traffic sent across the WAN link by increasing the values for three SET parameters:

- Delay Before First Watchdog Packet (default: five minutes)
- Delay Between Watchdog Packets (default: one minute)
- Number of Watchdog Packets (default: 10 watchdog packets)

The default values apply to IntranetWare, NetWare 4, and NetWare 3. You can use the SET utility to change these parameters on your server. For IntranetWare and NetWare 4, you can also use the SERVMAN utility.

S:\-NC1IDG\TRACES\IDLE.TR1

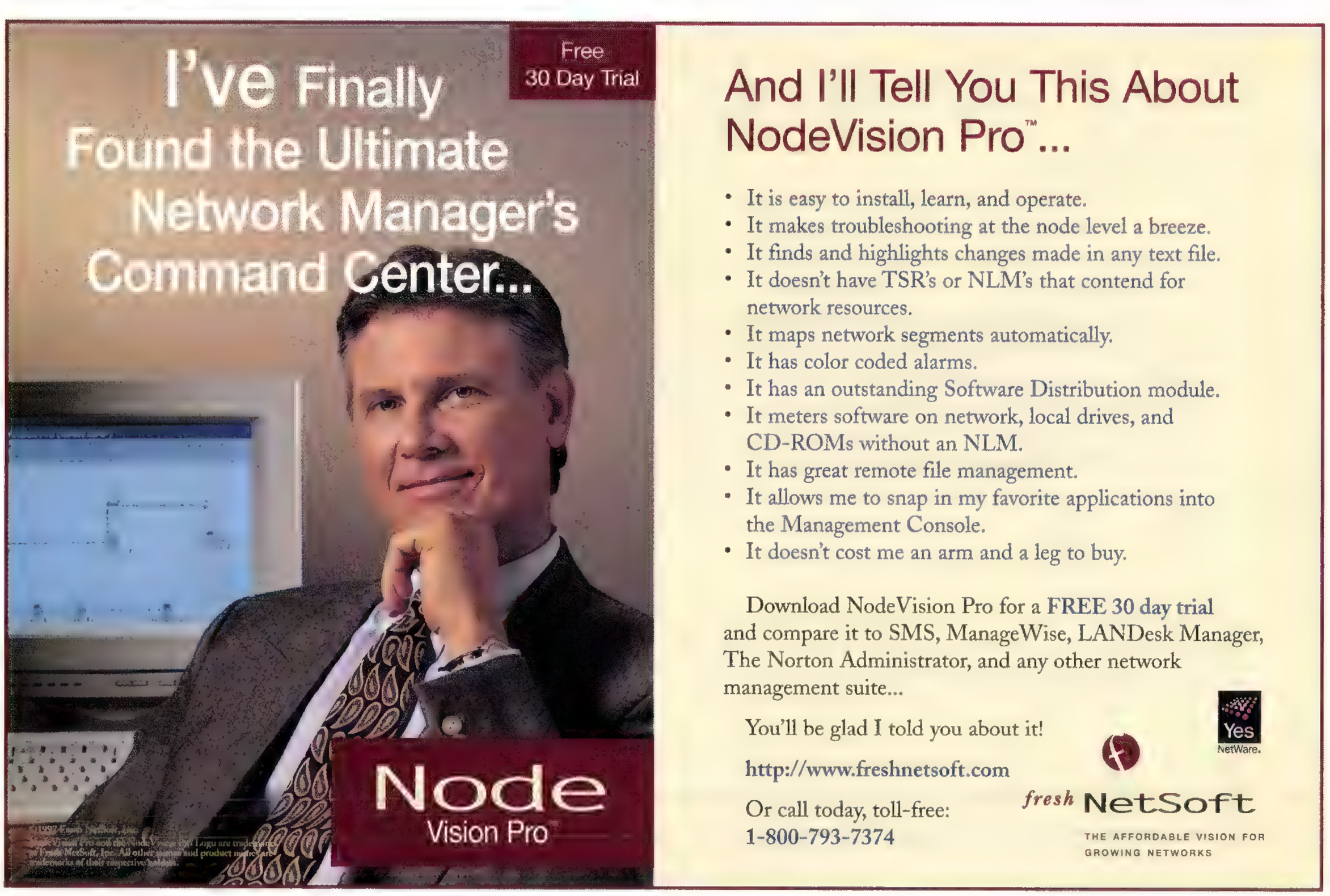
No	Source	Destination	Layer	Summary	Error	Size	Interpacket	Absolute Time	Relative Time
1	0080C767A093	COMPAQ-FS3	rip	Req network=BA 5E BA 11		64	0 µs	4:15:34 PM	0 µs
2	COMPAQ-FS3	0080C767A093	rip	Resp network=BA 5E BA 11, 1 hop		64	522 µs	4:15:34 PM	522 µs
3	FS2	Broadcast	nlsp	LAN Level 1 NLSP Hello Packet		100	3 s	4:15:38 PM	3 s
4	COMPAQ-FS3	FS2	ser	Novell Serialization (Copy Protection)		64	266 ms	4:15:38 PM	4 s
5	COMPAQ-FS3	FS2	ser	Novell Serialization (Copy Protection)		64	100 µs	4:15:38 PM	4 s
6	COMPAQ-FS3	FS2	ser	Novell Serialization (Copy Protection)		64	94 µs	4:15:38 PM	4 s
7	COMPAQ-FS3	FS2	ser	Novell Serialization (Copy Protection)		64	91 µs	4:15:38 PM	4 s
8	COMPAQ-FS3	FS2	ser	Novell Serialization (Copy Protection)		64	91 µs	4:15:38 PM	4 s
9	COMPAQ-FS3	0080C767A093	wdog	Poll inactive station, Conn=4		64	95 µs	4:15:38 PM	4 s
10	0080C767A093	COMPAQ-FS3	wdog	Session is valid, Conn=4		64	381 µs	4:15:38 PM	4 s
11	FS2	Broadcast	nlsp	LAN Level 1 NLSP Hello Packet		102	1 s	4:15:39 PM	5 s
12	COMPAQ-FS3	Broadcast	nlsp	LAN Level 1 NLSP Hello Packet		102	2 s	4:15:41 PM	7 s
13	COMPAQ-FS3	Broadcast	nlsp	LAN Level 1 NLSP Hello Packet		100	373 ms	4:15:41 PM	7 s

```
Packet Number : 4                    4:15:38 PM
Length : 64 bytes
802.3: ========== IEEE 802.3 Datalink Layer ==========
       Station  COMPAQ-FS3 -----> FS2
       Length  36
 ipx   ========== Internetwork Packet Exchange ==========
       Checksum: 0xFFFF
       Length. 36
       Hop Count:  1
       Packet Type  4(IPX)
       Network: 00 00 00 33          --->  00 00 00 22
       Node:    00-00-00-00-00-01    --->  00-00-00-00-00-01
       Socket:  0x0000               --->  Serialize
ser: ========== Novell Serialization (Copy Protection) Packet ==========
       Serialization Data. 0 4 32 48 40 55
```

Figure 1. *IntranetWare and NetWare serialization occurs approximately every 66 seconds.*

SPX KEEP-ALIVE

Because SPX applications are connection oriented, each SPX application performs an SPX "handshake" with its partner before transferring data. Each side of an SPX connection is called a



Circle 118 on the reader service card.

Preserving WAN Bandwidth

S:\—NC1IDG\TRACES\IDLE.TR1

No.	Source	Destination	Layer	Summary	Error	Size	Interpacket	Absolute Time	Relative Time
1	0080C767A093	COMPAQ-FS3	rip	Req network=BA 5E BA 11		64	0 µs	4:15:34 PM	0 µs
2	COMPAQ-FS3	0080C767A093	rip	Resp network=BA 5E BA 11, 1 hop		64	522 µs	4:15:34 PM	522 µs
3	FS2	Broadcast	nlsp	LAN Level 1 NLSP Hello Packet		100	3 s	4:15:38 PM	3 s
4	COMPAQ-FS3	FS2	ser	Novell Serialization (Copy Protection)		64	266 ms	4:15:38 PM	4 s
5	COMPAQ-FS3	FS2	ser	Novell Serialization (Copy Protection)		64	100 µs	4:15:38 PM	4 s
6	COMPAQ-FS3	FS2	ser	Novell Serialization (Copy Protection)		64	94 µs	4:15:38 PM	4 s
7	COMPAQ-FS3	FS2	ser	Novell Serialization (Copy Protection)		64	91 µs	4:15:38 PM	4 s
8	COMPAQ-FS3	FS2	ser	Novell Serialization (Copy Protection)		64	91 µs	4:15:38 PM	4 s
9	COMPAQ-FS3	0080C767A093	wdog	Poll inactive station; Conn=4		64	95 µs	4:15:38 PM	4 s
10	0080C767A093	COMPAQ-FS3	wdog	Session is valid; Conn=4		64	381 µs	4:15:38 PM	4 s
11	FS2	Broadcast	nlsp	LAN Level 1 NLSP Hello Packet		102	1 s	4:15:39 PM	5 s
12	COMPAQ-FS3	Broadcast	nlsp	LAN Level 1 NLSP Hello Packet		102	2 s	4:15:41 PM	7 s
13	COMPAQ-FS3	Broadcast	nlsp	LAN Level 1 NLSP Hello Packet		100	373 ms	4:15:41 PM	7 s

```
Packet Number   9                4 15 38 PM
Length   64 bytes
802.3  ========== IEEE 802.3 Datalink Layer ==========
       Station  COMPAQ-FS3 ----> 00-80-C7-67-A0-93
       Length  35
802.2  ========== IEEE 802.2 Logical Link Control ==========
       SSAP  NetWare     DSAP  NetWare
       Unnumbered Command  Unnumbered Information (UI)
 ipx   ========== Internetwork Packet Exchange ==========
       Checksum  0xFFFF
       Length  32
       Hop Count   1
       Packet Type: 4(IPX)
       Network: 00 00 00 33          --->  BA 5E BA 11
       Node     00-00-00-00-00-01    --->  00-80-C7-67-A0-93
       Socket   0x4001               --->  0x4021
vdog   ========== NetWare Watchdog Packet ==========
       Connection Number: 4
       Signature Character:  ? (Poll inactive station)
```

Figure 2. *An IntranetWare or NetWare server sends NCP watchdog packets to identify valid connections.*

partner. For example, if you were to use Novell's RCONSOLE utility, this utility would instruct the Novell client on your workstation to initiate a connection with the server that supports the RSPX and REMOTE NetWare Loadable Modules (NLMs). The SPX partners in this case are the Novell client (acting on behalf of the SPX application) and the server.

Because an SPX application sends an acknowledgment request with the data being transmitted, the SPX partner sends an acknowledgment packet after receiving this data. The following are common SPX applications:

- NetWare for SAA Gateway
- Btrieve
- Print server applications such as Novell's PSERVER utility and Hewlett-Packard's JetDirect
- Backup applications such as Cheyenne's ARCserve and Seagate's Backup Exec for NetWare

SPX applications such as the ones listed above use a keep-alive, or watchdog, process that is similar to the NCP watchdog process: By default, the SPX partners send watchdog packets to each other after their connection has been idle six seconds. For example, Figure 3 shows SPX watchdog traffic from an idle RCONSOLE session.

You can decrease SPX watchdog traffic in the following ways:

- Increase the time before the SPX watchdog process begins, and increase the interval between the SPX watchdog packets.
- Disable the SPX watchdog process at the workstation to stop the Novell client from sending SPX watchdog requests to the server. (However, the client will still answer SPX watchdog requests from the server.)
- Purchase a router that can perform SPX watchdog spoofing.

Increase Time Before the SPX Process Begins

To decrease the number of SPX watchdog packets sent over a WAN link, you can change the following SPX parameters.

- **SPX Watchdog Verify Timeout.** This parameter specifies the time in ticks that an SPX partner waits before requesting a watchdog packet from its SPX partner. (A tick is approximately 1/18 of a second. Default: 108 ticks.)
- **SPX Ack Wait Timeout.** This parameter specifies the time in ticks that an SPX partner waits for an acknowledgment packet before resending an SPX watchdog packet. (Default: 54 ticks.)
- **SPX Watchdog Abort Timeout.** This parameter specifies the time in ticks that the SPX partner waits without receiving an acknowledgment packet from its partner before concluding that the connection is no longer valid. (Default: 540 ticks.)

For example, to make the server wait a longer time before sending an SPX watchdog query, you would increase the SPX Watchdog Verify Timeout parameter and the SPX Ack Wait Timeout parameter. You could increase the SPX Watchdog Verify Timeout parameter to 14 seconds, and you could increase the SPX Ack Wait Timeout parameter to three minutes.

On an IntranetWare or NetWare 4 server, you can use the INETCFG utility to change the SPX parameters. (You must load the INETCFG utility at the IntranetWare or NetWare 4 server console.)

You can also change the SPX parameters at the workstation level. If you are

C:\LZFW\08SPX-1.TR1

No.	Source	Destination	Layer	Summary	Error	Size	Interpacket	Absolute Time	Relative Time
65	SERV1	JILL	spx	Send ACK, connID: 36174->22874		58	0 µs	5:14:42 PM	8 s
66	JILL	SERV1	spx	System Packet; connID: 22874->36174		64	1 ms	5:14:42 PM	8 s
67	SERV1	JILL	spx	Send ACK, connID: 36174->22874		583	1 ms	5:14:42 PM	8 s
68	JILL	SERV1	spx	System Packet, connID: 22874->36174		64	1 ms	5:14:42 PM	8 s
69	SERV1	JILL	spx	Send ACK, connID: 36174->22874		583	1 ms	5:14:42 PM	8 s
70	JILL	SERV1	spx	System Packet, connID: 22874->36174		64	1 ms	5:14:42 PM	8 s
71	SERV1	JILL	spx	Send ACK, connID: 36174->22874		441	1 ms	5:14:42 PM	8 s
72	JILL	SERV1	spx	System Packet, connID: 22874->36174		64	1 ms	5:14:42 PM	8 s
73	JILL	SERV1	spx	System Packet; connID: 22874->36174		64	8 s	5:14:50 PM	16 s
74	SERV1	JILL	spx	System Packet, connID: 36174->22874		64	4 s	5:14:54 PM	20 s
75	JILL	SERV1	spx	System Packet, connID: 22874->36174		64	3 s	5:14:58 PM	23 s
76	JILL	SERV1	spx	System Packet, Send ACK; connID: 22874->36174		64	8 s	5:15:05 PM	31 s
77	SERV1	JILL	spx	System Packet, connID: 36174->22874		64	0 µs	5:15:05 PM	31 s
78	JILL	SERV1	spx	System Packet, connID: 22874->36174		64	8 s	5:15:13 PM	39 s
79	SERV1	JILL	spx	System Packet, connID: 36174->22874		64	5 s	5:15:18 PM	44 s
80	JILL	SERV1	spx	System Packet, connID: 22874->36174		64	2 s	5:15:20 PM	46 s
81	JILL	SERV1	spx	System Packet, connID: 22874->36174		64	8 s	5:15:28 PM	54 s
82	SERV1	JILL	spx	System Packet, connID: 36174->22874		64	2 s	5:15:30 PM	56 s
83	JILL	SERV1	spx	System Packet, connID: 22874->36174		64	6 s	5:15:35 PM	61 s
84	SERV1	JILL	spx	System Packet, Send ACK; connID: 36174->22874		64	6 s	5:15:42 PM	67 s
85	JILL	SERV1	spx	System Packet, connID: 22874->36174		64	1 ms	5:15:42 PM	67 s

```
 ipx   ========== Internetwork Packet Exchange ==========
       Checksum  0xFFFF
       Length  42
       Hop Count:  0
       Packet Type:  5(SPX/SPXII)
       Network:  BE AD 00 01         --->  2F 11 54 A2
       Node      00-00-1B-3A-02-E1   --->  00-00-00-00-00-01
       Socket    0x4016              --->  NW 386
 spx   ========== NetWare Sequenced Packet Exchange Protocol ==========
       Connection Control  0x80 (System Packet )
       Datastream Type  0
       Source Connection ID:  22874
       Destination Connection ID  36174
       Sequence Number:  6
       Acknowledge Number:  15
       Allocation Number:  21
```

Figure 3. *An idle RCONSOLE session initiates the SPX watchdog process.*

using Novell's NETX shell or Virtual Loadable Module (VLM) client, you can change SPX watchdog parameters in the NET.CFG file. If you are using Novell's IntranetWare client or NetWare Client 32, you can change the SPX parameters by accessing your Windows 95 Control Panel. Then you select Network, IPX 32-bit Protocol for Novell NetWare Client 32, and SPX.

Changing these parameters can significantly reduce the overhead on a WAN link. If you have a dial-on-demand WAN link, however, you should disable the SPX watchdog process or purchase a router that performs SPX spoofing.

Disable the SPX Watchdog Process

You can also prevent an SPX application on your workstation from using the SPX watchdog process to periodically validate SPX connections. If you are using Novell's NETX shell or VLM client, you can disable the SPX watchdog process by entering SPX WATCHDOGS = OFF under the PROTOCOL IPX heading in the NET.CFG file.

Of course, the Off setting specifies that the workstation cannot use the watchdog process. However, using the Off setting does not disable the SPX watchdog process at the server. If the server sends an SPX watchdog request to your workstation, the Novell client still answers this request.

If you are using the IntranetWare client or the NetWare Client 32, you can disable the SPX watchdog process by accessing your Windows 95 Control Panel. Then select Network, IPX 32-bit Protocol for Novell NetWare Client 32, and SPX. You must then deselect the Allow Connection Watchdogging option.

If you want to disable the SPX watchdog process at the server, you can use the SPXWDOG NLM. You can download this NLM from the Novell Support Connection World-Wide Web (WWW) site at http://support.novell.com. (Use the search engine to find the STRTL5.EXE file.)

Purchase a Router That Performs SPX Watchdog Spoofing

To eliminate SPX watchdog traffic across a WAN link, you can use a router that performs SPX watchdog spoofing. For example, Cisco's IOS Software 11.1 includes an IPX/SPX spoofing parameter that enables the router to respond to SPX watchdog packets on behalf of your workstation. (For more information about Cisco's IOS Software 11.1, see http://www.cisco.com/warp/public/732/Releases.)

QUEUE SAMPLING

Your printer configuration can also generate unnecessary traffic if you assign a print server to a remote printer that is located on the other side of a WAN link. When a printer is idle, the print server assigned to that printer queries its print queue at regular intervals. This process is called *queue sampling*, or *queue polling*.

IntranetWare and NetWare 4 have a default queue sampling interval of five seconds; NetWare 3 and NetWare 2 have a default queue sampling interval of 15 seconds. (The *queue sampling interval* is the number of seconds between each query.) Unless you have changed the default setting, the print server looks for jobs in the print queue every five to 15 seconds,

Windows 95 Windows NT Windows 3.1 Windows for Workgroups

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depending on which version of the operating system you are running. This queue sampling is a nightmare for WAN links.

You can solve this problem in one of two ways:

- Do not configure a print server to service print queues that are located on the other side of a WAN link.
- Use Novell's NetWare Administrator (NWADMIN) utility or Novell's PCONSOLE utility to increase the queue sampling interval to the maximum setting, which is 255 seconds. (See Figure 4.)

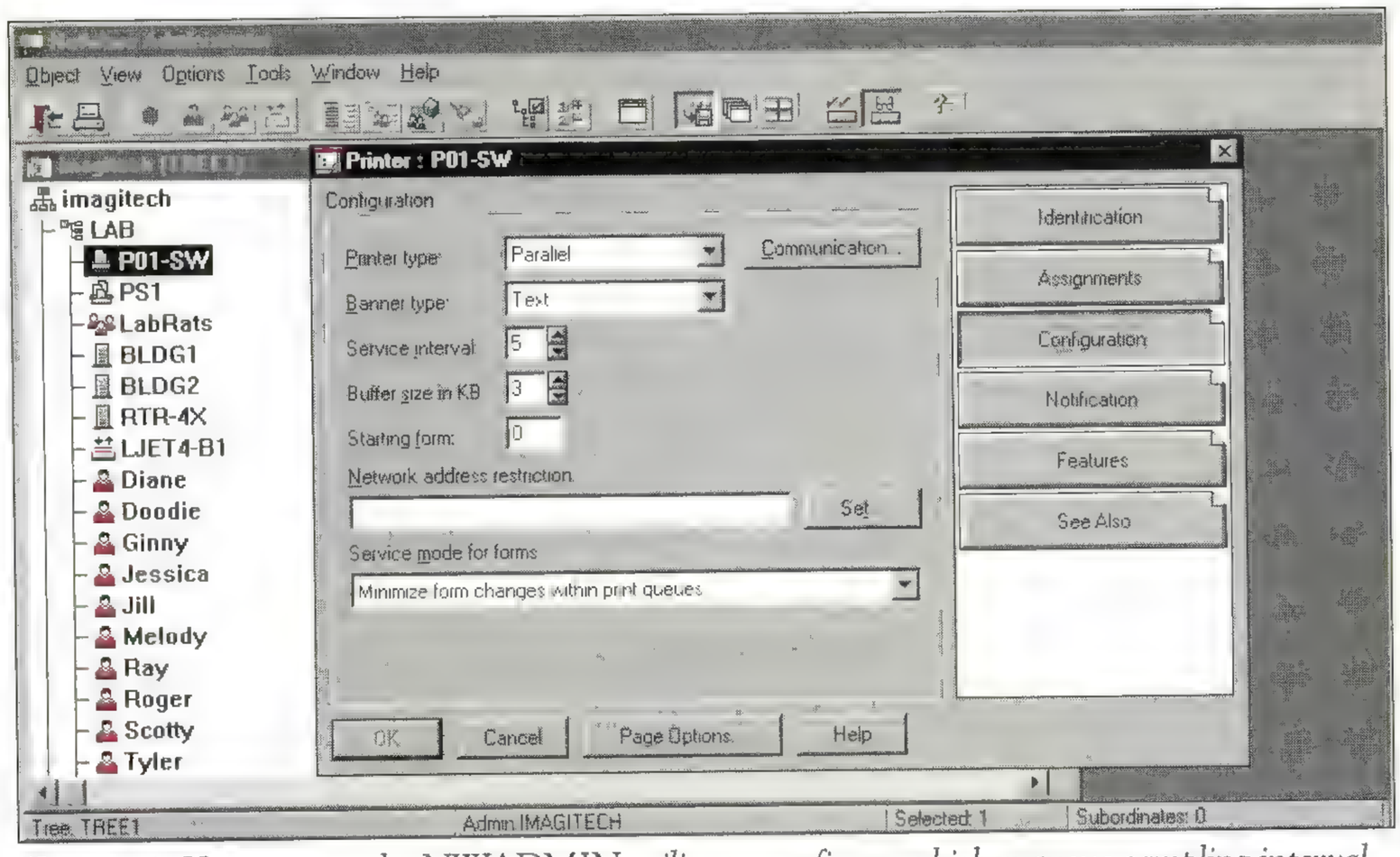

Figure 4. *You can use the NWADMIN utility to configure a higher queue sampling interval.*

CONCLUSION

Analyzing the communications sent across your company's network is essential—what you don't know can hurt you. If network devices are sending serialization packets, NCP watchdog packets, SPX watchdog packets, and queue sampling packets across a WAN link, you should prevent these packets from crossing the WAN link or reduce the number of packets being sent. Taking these steps will improve performance and even reduce costs if your company has a dial-on-demand WAN link and pays for this link on a per-packet basis.

Laura Chappell researches, writes, and lectures on NetWare protocol performance, troubleshooting, and optimization. She speaks at NetWare Conferences and presents customized training courses on network analysis. You can reach Laura at lchappell@imagitech.com, and you can view her trace files and presentation notes at www.imagitech.com.

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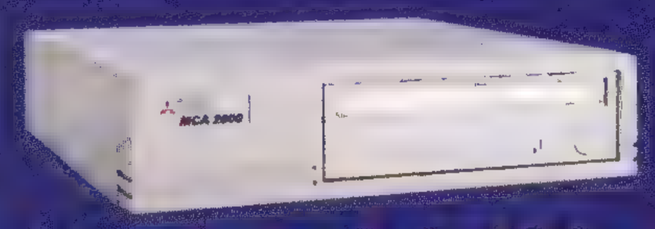

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Kimberly Brinkerhoff-Jones

InfiLearning Centers

Novell Education Takes on Multivendor Training

Companies have been talking about multivendor training for years, but getting these companies to agree on a multivendor training program seemed to be an impossible task. Just when you thought that multivendor training would never happen, Novell Education has announced the new InfiLearning Center program. Through this program, Novell Education will create InfiLearning Centers throughout the world to offer courses from industry-leading companies.

UNDER ONE ROOF

If you were asked to name several companies that offer training in using networking, intranet, and Internet products, you would undoubtedly list companies such as Novell, Netscape Communications, Sun Microsystems, Oracle, Lotus, Microsoft, and NetObjects. To receive training from any of these companies, you can now visit a Novell authorized education center (NAEC) that is participating in the InfiLearning Center program.

Not only do InfiLearning Centers offer training from multiple companies, but they also offer multiple training solutions: You can take instructor-led courses, or you can purchase self-study courses in text, video, and multimedia formats. For example, multimedia-based courses from Novell, Netscape Communications, Sun Microsystems, Cisco Systems, Lotus, Microsoft, Powersoft, and Marimba are now available on CD-ROM. Later this year, Novell Education will also provide online training that will combine the convenience of a self-study course with the benefits of an instructor-led course.

GET CERTIFIED

If you are interested in intranet and Internet training, InfiLearning Centers are the best place to earn your intranet and Internet certification. At your local InfiLearning Center, you can participate in the Certified Internet Professional program, which is now being jointly developed by Novell and Netscape Communications. This program is the industry's first multivendor intranet and Internet certification program, and it will be available at all InfiLearning Centers this fall.

The Certified Internet Professional program is an enhanced version of the Novell Certified Internet Professional program, which includes five tracks: Internet Business Strategist, Web Designer, Web Developer, Intranet Manager, and Internet Architect. Novell and Netscape Communications are working together to enhance these tracks and to provide training in additional intranet and Internet skills. In addition to focusing on products from Novell and Netscape Communications, the courses and tests in the Certified Internet Professional program will feature products from companies such as Sun Microsystems and NetObjects. (When the Certified Internet Professional program is released, *NetWare Connection* will provide details about this program and explain how it affects you if you are an existing Novell Certified Internet Professional or if you are in the process of earning your Novell Certified Internet Professional certification.)

BUT THAT'S NOT ALL

InfiLearning Centers also provide services such as career counseling and financial aid. To determine what type of training you need, you can even use a variety of diagnostic tools to assess your current technical knowledge about Novell and third-party products. You can also use these tools to generate a blueprint of recommended courses and training methods based on the demographic information, learning preferences, and career objectives you specify.

One of the most useful tools you can access is the InfiLearning job bank, which allows you to search a database of current job openings by location, salary range, job title, or required qualifications. You can also post your resume, which prospective employers can then access, and you can create an InfiLearning World-Wide Web (WWW) page that contains your resume and lists your training experience.

CNE Still Means Certified Novell Engineer

The Circuit Court of Cook County recently upheld Novell's right to use the term *engineer* as part of the title *Certified Novell Engineer.* This ruling reversed a cease and desist order that had been issued by the Illinois Department of Professional Regulation.

Like most states in the United States, Illinois regulates the use of the term *engineer*: To protect the public, Illinois enacted the Illinois Professional Engineering Act, which defines a professional engineer as a person who is qualified to design, build, and maintain structures. Before an engineer can practice in Illinois, that engineer must submit evidence that he or she is qualified to be a civil, structural, mechanical, or electrical engineer.

As a result, the Illinois Department of Professional Regulation objected to Novell's use of the title *Certified Novell Engineer,* believing that this title might confuse the public: The department feared that the public might mistake a Certified Novell Engineer (CNE) as a professional engineer who is qualified to work on structures.

Although the Illinois Department of Professional Regulation sought to prevent Novell from using the title *Certified Novell Engineer*, the Circuit Court of Cook County concluded that this title did *not* create confusion or harm the public. In fact, the Court stated that the words *Certified Novell* clearly distinguished CNEs from professional engineers and found that CNEs in Illinois were not representing themselves as professional engineers. As Craig Christensen, senior corporate counsel for Novell, explains, "Individuals use the CNE credential to show they're qualified to support Novell computer networks, not to build bridges or roads."

After you have received training, you can take advantage of post-training support to stay up-to-date with all of the latest industry news and technical information. You can still access existing Novell Education services such as certification benefits, libraries, and online technical support. However, all of these services will soon be available from one location—the InfiLearning WWW site, which you will be able to access from your local InfiLearning Center. In addition, you can communicate with other users through a special chat forum, and you can attend virtual conferences that feature prominent networking, intranet, and Internet professionals.

NAEC SUPPORT

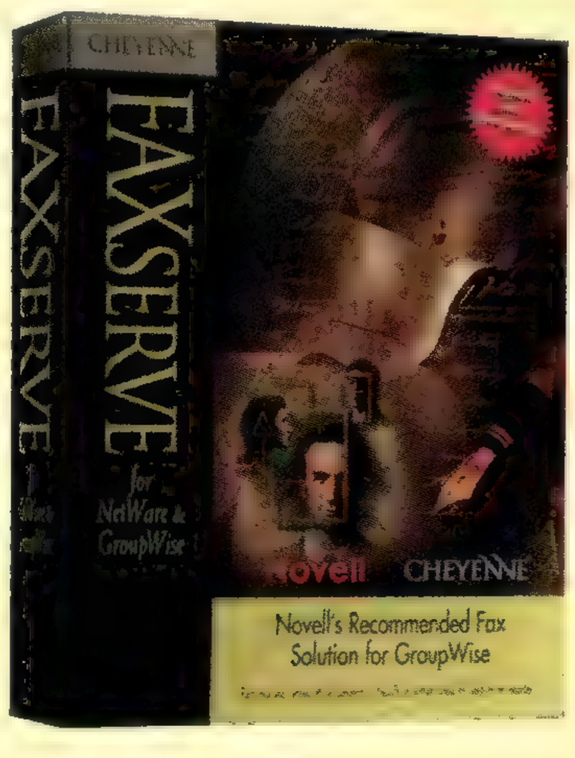
At Edge '97, Novell Education's fourth-annual channel-partner conference that was held in June, Novell Education introduced the InfiLearning Center program to NAECs worldwide, and many of these NAECs have already become InfiLearning Centers. For example, more than 200 NAECs joined Novell Education to launch the InfiLearning Center program at Edge '97 in Puerto Rico. Since then, companies such as New Horizons Learning Centers, which runs 195 NAECs in 24 countries, have also joined the InfiLearning Center program.

CONCLUSION

There's no better time than now for multivendor training: As the intranet and Internet phenomenon continues to explode, more and more companies are throwing out their old, proprietary solutions and switching to open standards and multivendor products. By creating both the InfiLearning Center program and the Certified Internet Professional program, Novell Education is providing valuable training for users who must have the necessary skills to integrate and manage products from a variety of companies. Bob Puissant, vice president and general manager of Novell Education, explains, "We are embracing the industry and capitalizing on the obvious: it is not a single-vendor world."

For more information about the InfiLearning Center program or to find the InfiLearning Center nearest you, contact your local NAEC. You can also call 1-800-233-EDUC or 1-801-222-7800, or you can visit Novell Education's WWW site (http://education.novell.com).

For information about the Circuit Court of Cook County's recent ruling regarding the use of the title *Certified Novell Engineer*, see "CNE Still Means Certified Novell Engineer."



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Ann Cude

Practical Networking

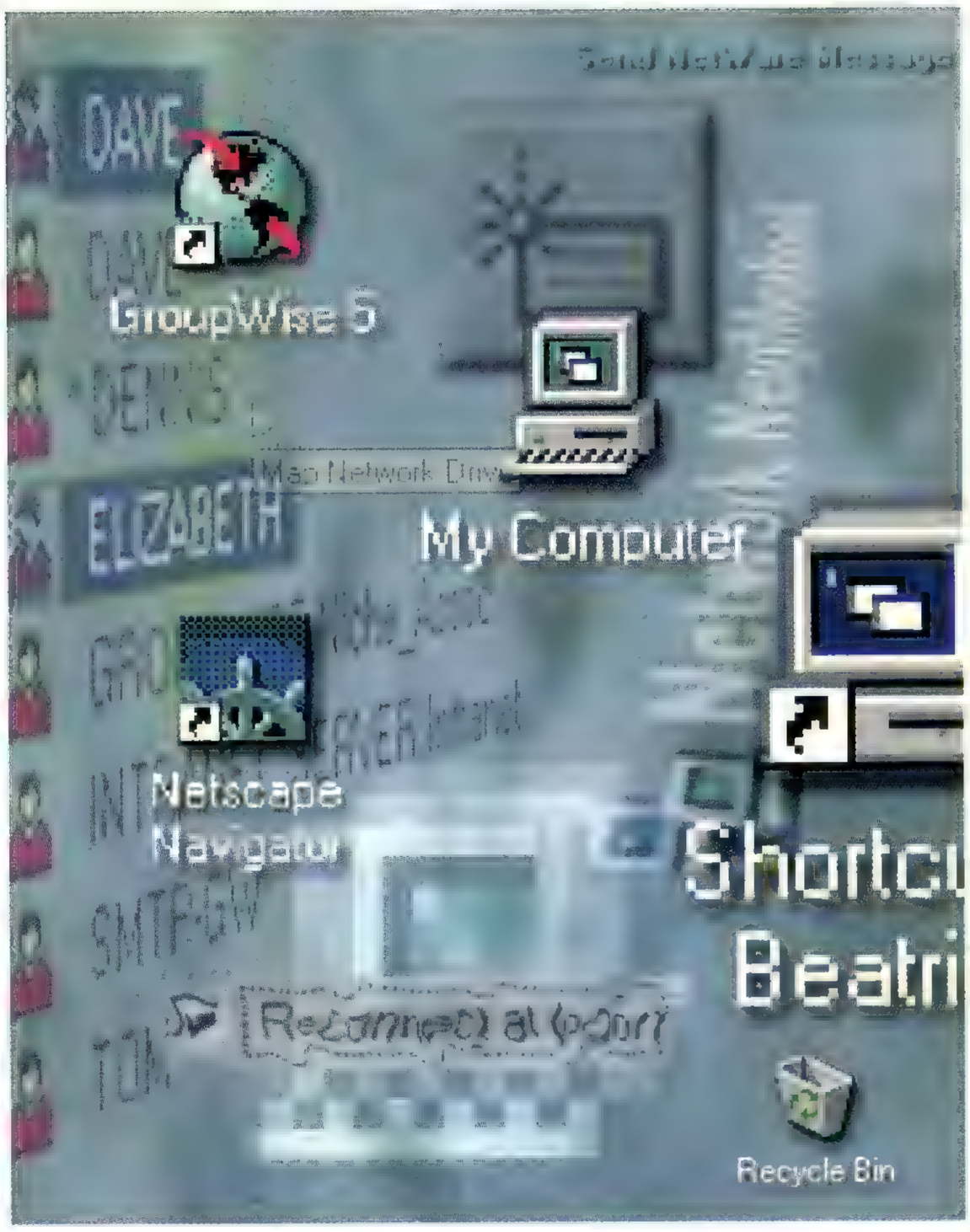
New Moves in Windows 95

This issue of *NetWare Connection* introduces a new column for novice and experienced IntranetWare/NetWare users: "Practical Networking" will offer useful tips and step-by-step instructions that will save you time in performing tasks and help you get the most out of your company's network or intranet. This month, "Practical Networking" explains how to use two IntranetWare/NetWare features from a Windows 95 workstation: sending a network broadcast message and mapping a network drive. (These features are available with NetWare 2 and higher.)

SENDING A NETWORK BROADCAST MESSAGE FROM WINDOWS 95

As you know, the IntranetWare/NetWare broadcast message feature enables you to send short messages to a user or a group of users who are logged in to your company's network or intranet. In Windows 3.x, you access this feature through NetWare User Tools. In Windows 95, however, you access this feature through Network Neighborhood. To send an IntranetWare/NetWare broadcast message from a Windows 95 workstation, you complete the following steps:

1. Double-click the Network Neighborhood icon on your desktop (or right-click this icon, and then select Open).
2. A list of network resources appears. Right-click the name of the server to which the intended recipients of your message are connected.
3. Select the Send Message option from the pop-up menu that appears. (See Figure 1.) The Send NetWare Message dialog box then appears. This box contains a blank line in which to type your message, a list of usernames arranged in alphabetical order, and three buttons: Send, Show Groups, and Cancel. Your cursor is automatically positioned at the beginning of the blank line.
4. Type a broadcast message, which can consist of up to 250 characters minus the number of characters needed to display who the message is from. (IntranetWare/NetWare automatically inserts "From:" followed by your username and connection number at the beginning of the message.)
5. Do not press the Enter key after you have finished typing the broadcast message. Instead, move your cursor to the User Name box, and click the name of the user to whom you want to send this message. (The list of usernames will contain only the names of users who are authenticated to the server you selected in step 2.)



If you want to send the broadcast message to more than one user, select each username by holding down either the Control key or the Shift key. (The Control key allows you to select an individual username; the Shift key allows you to select a range of usernames.) Each username you select is highlighted. (See Figure 2 on p. 42.) (You can deselect a username or a range of usernames in the same manner.)

If you want to send the broadcast message to one or more groups of users, click the Show Groups button. (This button toggles between Show Groups and Show Users. You cannot select both individual usernames and groups.) Then select the group or groups to which you want to send this message, just as you would select individual usernames.

Note: In addition to usernames, other network objects may appear in the list of usernames. In Figure 2, for example, INTRANET_SERVER is a server, but IntranetWare recognizes it as a user because servers have the same type of connection to the network as workstations have. (See p. 42.) However, if you select a server to receive a broadcast message, IntranetWare/NetWare will *not* send the message to that server.

6. After you select the users or groups you want to receive the broadcast message, click the Send button, or press the Enter

Illustration: Eileen Neibaur

key. After you send this message, the Send NetWare Message Results box appears, displaying the status of the message and every user or group to whom the message was actually sent. Each user or group you selected will receive this message unless a user falls into one of the following categories:

- A user has entered the IntranetWare/NetWare SEND command to prevent broadcast messages from appearing on his or her monitor.
- A user has an asynchronous or remote connection.
- A user has attached to a NetWare 2 or NetWare 3 server using the ATTACH command. (IntranetWare and NetWare 4 do not support the ATTACH command.)

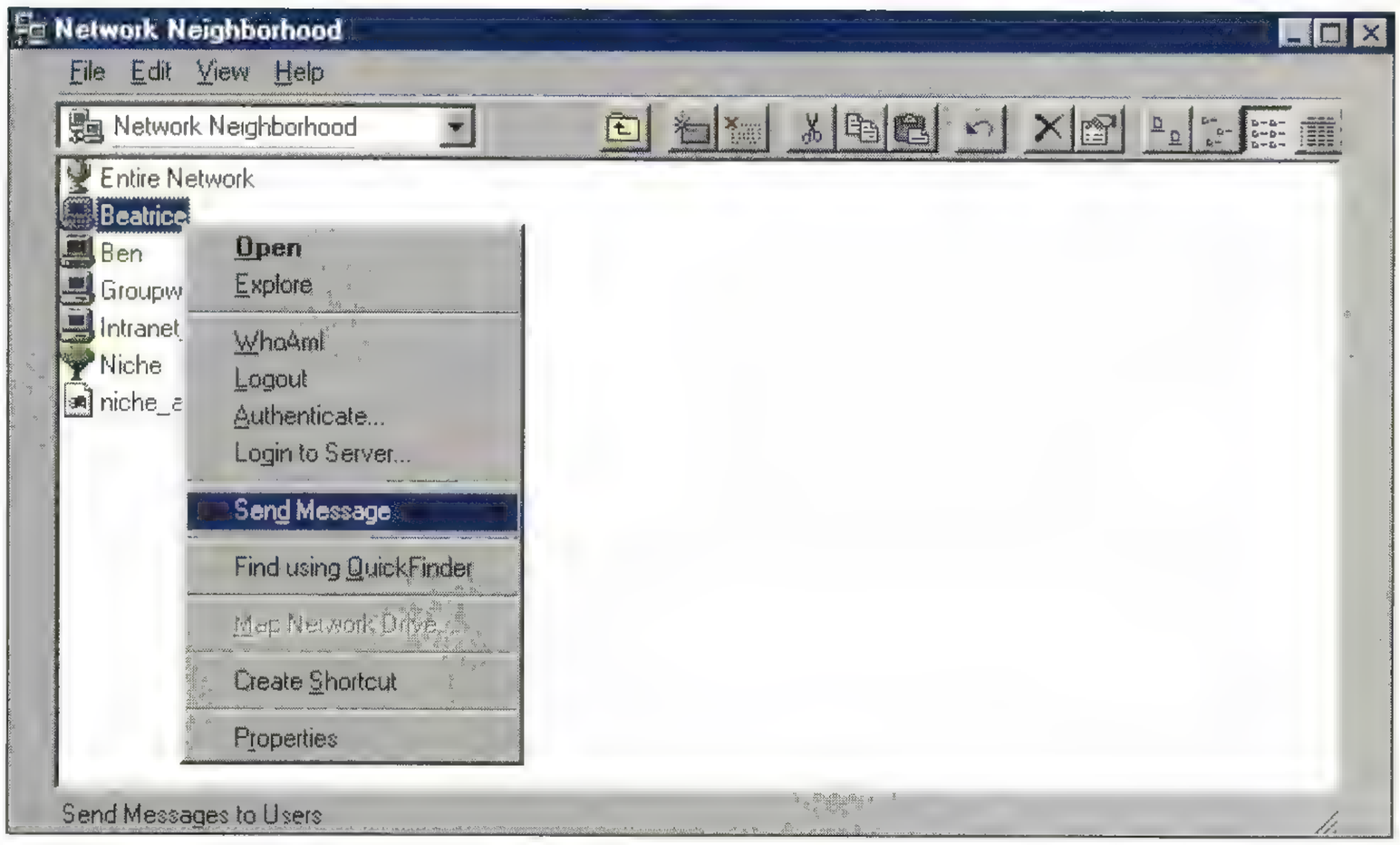


Figure 1. *To send an IntranetWare/NetWare broadcast message, you use the Windows 95 Network Neighborhood.*

The users who are eligible to receive broadcast messages receive your message immediately. They hear a beep, and the message appears on top of the documents or programs that are open on their screen. The message remains on the desktop until the user clicks the Close button on the message screen.

You can eliminate steps in this process by creating a shortcut to the server. To create this shortcut, complete the following steps:

1. Double-click the Network Neighborhood icon on your desktop, right-click the server name, and select the Create Shortcut option. A shortcut icon for the server appears.
2. Drag this icon to your desktop. If you right-click the icon, the menu that contains the Send Message option appears.

MAPPING A NETWORK DRIVE IN WINDOWS 95

If you frequently use a particular network resource, such as a folder or a server volume, you may want to map a drive to this resource. Then you can simply double-click this drive in Network Neighborhood, My Computer, or Windows Explorer to access the resource, saving you the trouble of entering a complete directory path or selecting items from a series of subdirectories.

In Windows 3.x, you have to access NetWare User Tools to map a drive to a network resource. In Windows 95, however, you complete the following steps:

1. Right-click the My Computer icon on your desktop.
2. From the menu that appears, select the Map Network Drive option. The Map Network Drive dialog box appears, displaying the next available drive letter. If you want to use a

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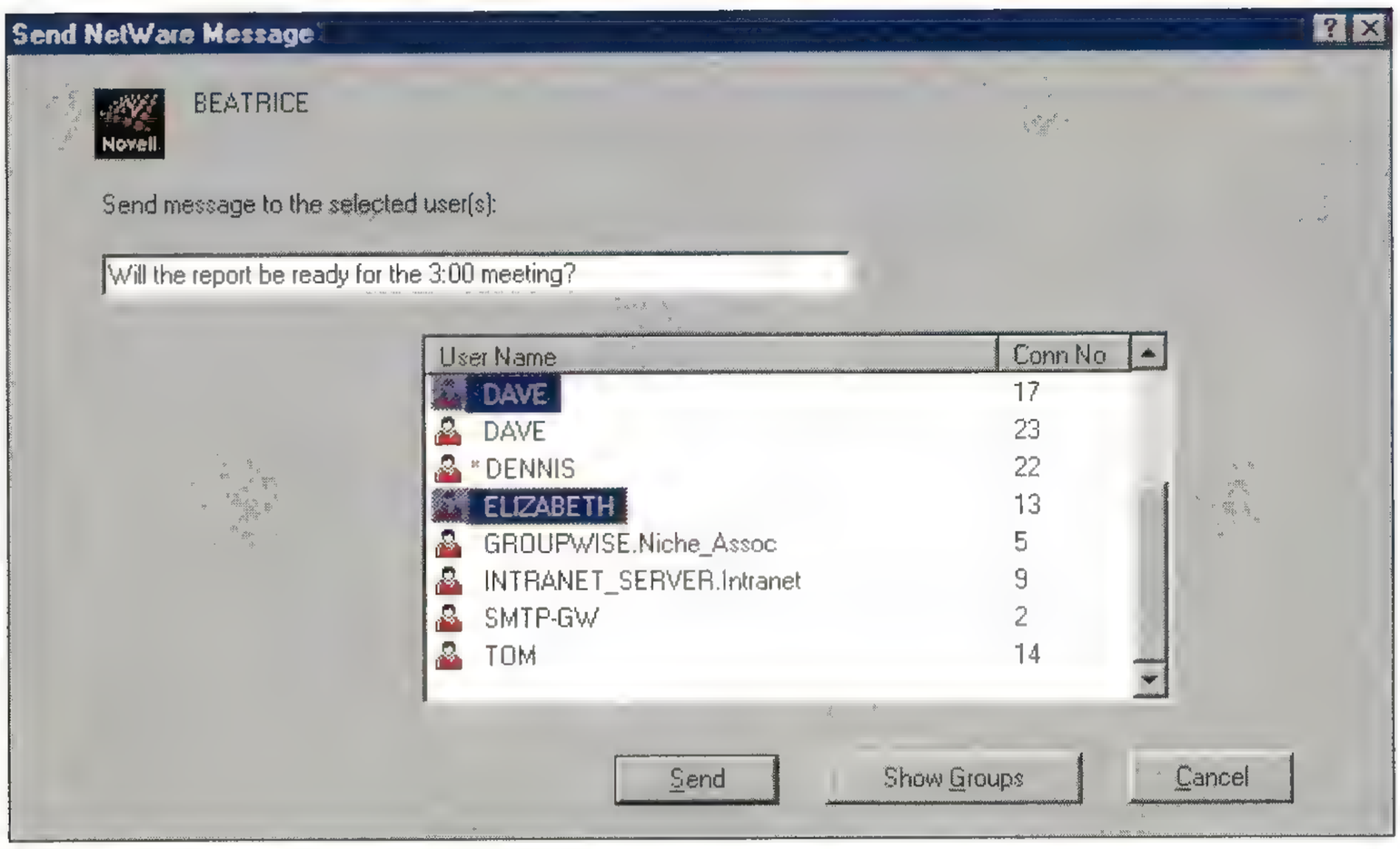

Figure 2. *You can choose to send a broadcast message to one user or to a group of users who are logged in to the network.*

different drive letter or view your current drive mappings, click the Drive arrow; a list of all drive letters appears. Each drive letter is followed either by its current assignment or by a blank space if the drive letter has no assignment.

3. In the Path field, type the directory path to the network resource that you want to access with this drive letter (for example, *servername**foldername*). (See Figure 3.)

   To map a drive to a network resource that you have used recently, click the Path arrow. A list of recently used resources appears; click the resource you want.

4. The drive mapping you create is temporary (that is, the drive mapping is erased when you log out of Windows 95), unless you click the Reconnect at Logon box. (See Figure 3.) If you click the Reconnect at Logon box, the drive mapping will be restored each time you log in to Windows 95.

If you are already in Network Neighborhood, My Computer, or Windows Explorer when you decide to map a drive, you can select the Map Network Drive button (the second button from the left) on the toolbar. (See Figure 4.) (If the toolbar is not visible, click View, and then select Toolbar.)

Figure 3. *To make your drive mapping permanent, you must click the Reconnect at Logon box.*

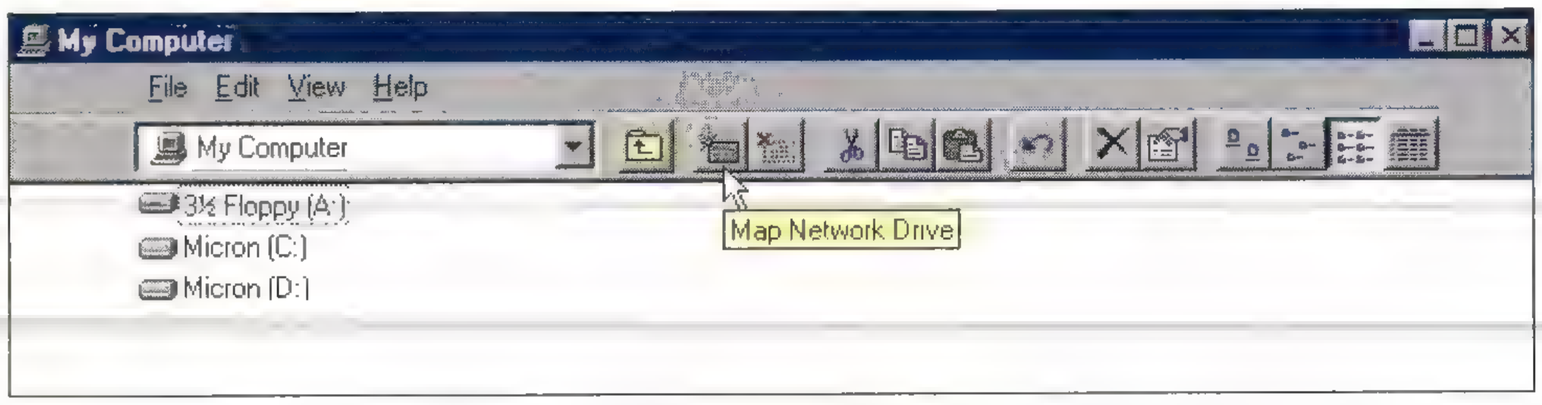

Figure 4. *If you are using Network Neighborhood, My Computer, or Windows Explorer, you can map a drive by choosing the Map Network Drive button from the toolbar.*

If you want to delete a drive mapping, you follow the same steps as the ones you follow to create a drive mapping. However, instead of selecting the Map Network Drive option, you select the Disconnect Network Drive option from Network Neighborhood, My Computer, or Windows Explorer, or you select the Disconnect Network Drive button (the third button from the left) on the toolbar. You then select the drive mapping you want to delete from the list of assigned drive letters that appears, and click OK. (You can deselect a drive letter by holding down the Control key and clicking the highlighted item.)

CONCLUSION

If you have recently upgraded to Windows 95, these tips will help you become familiar with the Windows 95 desktop. And because this column is written for both novice and experienced IntranetWare/NetWare users, you can use these tips to help your users make the move from Windows 3.x to Windows 95.

In future issues of *NetWare Connection*, "Practical Networking" will offer additional tips and step-by-step instructions that you can use on your company's network or intranet. For example, this column will cover topics such as the following:

- Using Novell's Macintosh client software with an IntranetWare or NetWare server
- Setting up World-Wide Web (WWW) pages for individual users
- Customizing the QuickFinder search tool on Novell Web Server 3.1
- Setting up Novell Workstation Manager to authenticate Windows NT Workstation users through Novell Directory Services (NDS)

To make "Practical Networking" even more useful, we need to hear from you. Please tell us what you want to learn about and what tips and step-by-step instructions you want to see in this column. To give us your suggestions, simply send an e-mail message to elizabeth@niche-associates.com.

Ann Cude works for Niche Associates, an agency that specializes in writing and editing articles about the networking industry. Niche Associates is located in Salt Lake City, Utah.

Novell NEWS

NDS on RS/6000 and S/390

Novell and IBM have announced that IBM will license Novell Directory Services (NDS) for IBM's RS/6000 and S/390 servers. This announcement builds on Novell's commitment to integrate NDS with a variety of UNIX platforms. In fact, IBM is joining other companies such as Hewlett-Packard, Sun Microsystems, and Santa Cruz Operation (SCO), which have already licensed NDS for their own UNIX platforms.

Integrating NDS with RS/6000 and S/390 servers offers significant benefits for both network administrators and users. If you are a network administrator, you can use NDS to efficiently manage the network resources on an RS/6000 or S/390 server just as you manage the resources on an IntranetWare or NetWare 4 server. As a result, you can manage all of the resources on your company's network or intranet from a central location, whether these resources reside on an IntranetWare or NetWare 4 server or on an RS/6000 or S/390 server.

If you are a user, you can use NDS to locate network resources on an RS/6000 or S/390 server quickly and easily. You can also log in to the NDS tree, which allows you to access all of the servers to which you have rights on your company's network or intranet. As a result, you do not have to log in to an IntranetWare or NetWare 4 server and then log in separately to an RS/6000 or S/390 server.

IBM plans to release NDS on RS/6000 later this year and NDS on S/390 sometime in 1998. For more information about NDS on RS/6000 and S/390, visit Novell's World-Wide Web (WWW) site (http://www.novell.com/press/archive/1997/07/pr97109.html) or IBM's WWW site (http://www.rs6000.ibm.com or http://www.s390.ibm.com). You can also call Novell at 1-800-NETWARE or 1-801-861-5588, or you can call IBM at 1-800-IBM-3333 or 1-520-574-4600.

IntranetWare for SAA: AS/400 Edition 2

Novell is now shipping IntranetWare for SAA: AS/400 Edition 2, the latest version of Novell's Systems Network Architecture (SNA) gateway. With IntranetWare for SAA: AS/400 Edition 2, you can integrate an AS/400 system with an IntranetWare or NetWare network. You can then access AS/400 applications and files from any DOS, Windows NT, Windows 95, Windows 3.1, OS/2, Macintosh, or UNIX workstation.

Because IntranetWare for SAA: AS/400 supports NDS, you can manage the network resources on an AS/400 system just as you manage the resources on an IntranetWare or NetWare 4 server. In addition, you can store client emulator configurations in NDS, which eliminates the need to configure each desktop.

In addition, IntranetWare for SAA: AS/400 includes a two-user version of Novell's IntranetWare, which you can use to turn your company's AS/400 environment into an intranet. IntranetWare for SAA: AS/400 also includes IBM's Files-On-Demand technology, a Java applet that allows you to seamlessly access AS/400 files from a WWW browser.

For more information or to purchase IntranetWare for SAA: AS/400 Edition 2, contact your local Novell authorized reseller. You can also visit Novell's WWW site (http://host.novell.com/as400_2), or you can call 1-800-NETWARE or 1-801-861-5588.

Oracle8 on IntranetWare

Oracle is now shipping Oracle8 on IntranetWare, the latest version of Oracle's industry-leading database software for Novell's IntranetWare platform. By running Oracle8 on an IntranetWare server, you can quickly access a large amount of information, and you can manage this information securely, reliably, and cost effectively over your company's network or intranet. You can also conduct high-speed transactions and run sophisticated object-relational applications.

Because Oracle8 supports NDS, you can manage the Oracle8 database from a central location, and you do not need to log in to this database separately. If you are authenticated to the NDS tree and you have rights to the database, you can access this database immediately, whether it runs on an IntranetWare, Windows NT, or UNIX server.

For more information or to purchase Oracle8 on IntranetWare, call 1-800-ORACLE1 or 1-415-506-7000. You can also visit Oracle's WWW site (http://www.oracle.com/platforms/novell/html/o8launch.html) or Novell's WWW site (http://www.novell.com/oracle/oracle8.html).

GroupWise DMS

Novell has announced that GroupWise DMS, a highly secure version of Novell's GroupWise 5 groupware product, has successfully completed all protocol conformance testing for compliance with the U.S. Defense Messaging System. As a result, GroupWise DMS is well on its way to receiving DMS certification, which ensures that products provide the features necessary for secure messaging. DMS certification is required by the U.S. Department of Defense and other U.S. government agencies for all e-mail software purchased after January 1, 1997.

GroupWise DMS includes the familiar GroupWise 5 interface and offers new features without requiring you to use gateways or add-on software. For example, GroupWise DMS allows you to create, send, and manage X.400 messages and to browse X.500 directories. In addition, GroupWise DMS supports the Military Messaging Protocol and the Message Security Protocol.

GroupWise DMS is now undergoing interoperability testing, which ensures that GroupWise DMS is fully compatible with other products that have already received DMS certification. After GroupWise DMS receives its own DMS certification, more than two million government and military users will be able to use GroupWise DMS as their messaging system.

For more information about GroupWise DMS, visit Novell's WWW site (http://www.novell.com/groupwise/html/defense.html). You can also call 1-800-NETWARE or 1-801-861-5588.

NetWare Users International

Solidarity

Standing Behind Novell

Brad Fischl

I would like to thank several people at Novell who have contributed a lot of time and energy to NetWare Users International (NUI) during the past year: For example, Joe Marengi, former president of Novell; Ron Heinz, executive vice president of sales; Ted Lloyd, director of End-User Services; and Tamera Miner, project manager of End-User Services, have all worked to strengthen the relationship between Novell and NUI.

Now the landscape at Novell is changing: With Eric Schmidt in the driver's seat as Novell's new CEO and with IntranetWare firmly established as Novell's flagship product, all of us in NUI must redouble our efforts to support Novell and ensure that our improved relationship with Novell only gets stronger. We must do whatever we can to increase awareness of Novell as the leading network and intranet company and IntranetWare as the leading network and intranet platform. Because we already know that IntranetWare is the best choice for users who need a reliable, secure network or intranet, it is up to us to get the word out to everyone else.

IT AIN'T NECESSARILY SO

I am doing my part by trying to combat the rumors, misconceptions, and outright lies being spread about Novell and IntranetWare. I continue to reassure users that Novell is healthy, wealthy, and wise. The recent restructuring process, although painful, has made Novell more competitive, sharpened its focus on networks and intranets, and reemphasized the most important aspect of any business: keeping customers happy.

Despite a barrage of twisted facts, many companies are realizing that Novell still has the products to get the job done better than any other company in the industry. Pretty packaging and marketing hype can take a product only so far. After you purchase, unwrap, and install a product, you may discover that the product looks better than it actually is. Unfortunately, companies are increasingly facing this problem, and we should be there to help them pick up the pieces by directing them to a better solution—IntranetWare.

NUI CAN MAKE A DIFFERENCE

The great thing about NUI is that we have the people and the knowledge to educate users and contribute to Novell's resurgence. An excellent resource that you can use is the series of

Reality Check documents posted on Novell's World-Wide Web (WWW) site (http://www.novell.com/intranetware/products/intranetware/product_information/comparative_information/reality_checks). Each of these documents focuses on a particular piece of incorrect information that has been disseminated about Novell products and explains what the truth is.

For example, you can find a Reality Check document that addresses the claims Microsoft made during its recent Scalability Day and the claims Microsoft continues to make about Windows NT Server. You can also find a Reality Check document that refutes the misconceptions Microsoft has been spreading about Novell's new BorderManager product.

Another excellent resource is the NUI liaison in your local Novell sales office. If you develop a close working relationship with this person, you can work together to help other networking professionals make informed decisions when purchasing network or intranet software. For example, the NUI liaison can provide the latest Novell product information, demo versions of new Novell products, and other resources that will help users understand the features and benefits of Novell products such as IntranetWare and BorderManager. And if you know of any companies that are planning to purchase network or intranet products, you can give the names of these companies to the NUI liaison at the sales office so that he or she can contact them.

CONCLUSION

If each of us takes the time to get the word out, we can make a difference. Because our networks and intranets are built using Novell products and because we want Novell to continue producing superior technologies, helping Novell succeed is not just in Novell's best interest—it's in our best interest as well.

Brad Fischl is the president of NUI, North America (NUI, NA). If you want to reach Brad, you can send an e-mail message to bradley.fischl@internetMCI.com.

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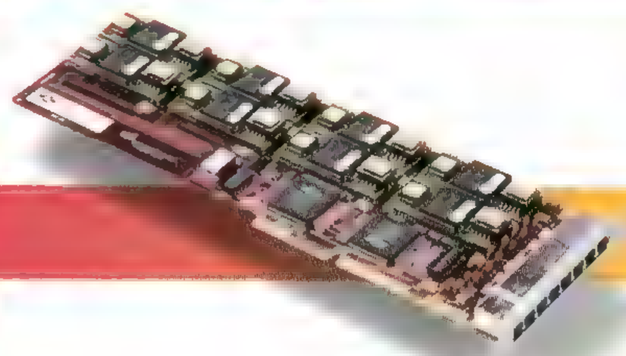

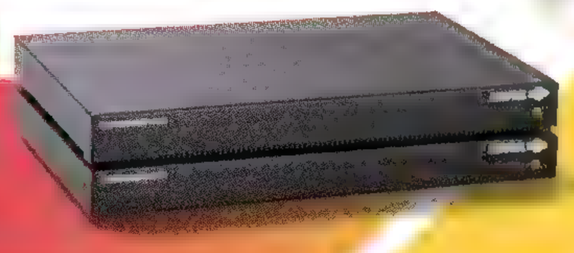

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Circle 126 on the reader service card.

Matthew Jones

Online Connection

Taking Stock

Until recently, you had to read a pile of books and magazines to learn about the stock market, and you had to call a stockbroker whether you wanted to purchase a few shares of stock or a controlling interest in a publicly held company. However, now that stock brokerage firms and financial analysts have discovered the Internet, you can find out what's happening in the financial world and even conduct stock transactions with just a few clicks of your mouse.

This article features World-Wide Web (WWW) sites that offer resources for Wall-Street wizards and investment novices who are just beginning to build a portfolio. As you wait for your net worth to explode, you might want to check out this month's network resources and games. You can then spend some of the money you make on the hot new products I have found. (See "Product Snapshots" on p. 48.)

INTERNET SITES

Before you purchase any stock, you can get the latest financial news and information from the CNN Financial Network (CNNfn) (http://www.cnnfn.com). At CNNfn, you can view articles and statistics about mutual funds, and you can read financial news stories. You can also access comprehensive information about U.S. and world markets, currencies, interest rates, commodities, and stock in high-tech companies. In addition, you can use CNNfn's mortgage calculator to determine how much you are paying for your home when you factor in interest.

If you want to stay up-to-date with all of the current financial news while you are browsing the WWW, you can download FN to Go. This JavaScript application displays financial headlines and stock quotes in a small browser window on your desktop whenever you are connected to the Internet.

Like CNNfn, Dow Jones Interactive Publishing offers the latest financial news and information as well as personal investment advice (http://bis.dowjones.com). At Dow Jones Interactive Publishing, you can download Dow Jones News/Retrieval, which is available for Windows 95, Windows 3.1, and Macintosh. You can use Dow Jones News/Retrieval to view and search business-related articles, corporate news, sports scores, and weather forecasts. You can also use Dow Jones News/Retrieval to organize news clippings from the sources you select.

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As the name implies, Zacks Investment Research provides tools that you can use to research market trends and reports from leading financial analysts (http://www.zacks.com). For example, you can purchase a one-year subscription to Research Wizard for U.S $600, or you can purchase a two-month trial subscription for only U.S. $55. Research Wizard is not for amateurs, however: Research Wizard is a software package that experienced investors can use to screen more than 6,000 companies, receive updated brokerage recommendations, and view and print the Zacks Company Report, which summarizes all of the current brokerage recommendations for any stock.

In addition, you can get a free, one-month trial subscription to Analyst Watch, a service that includes the latest analysts' reports, an online database of stock information, daily e-mail updates about changes in the market, and research software that you can use to get information about various companies and stocks offline. At Zacks Investment Research, you can also view free stock quotes, past and current market data, and corporate news and earnings announcements. You can even purchase hundreds of investment- and Internet-related books through the Zacks Online Bookstore.

Although many financial sites offer free stock quotes, few sites rival Quote.com (http://www.quote.com). Unlike other sites, which provide stock quotes that are delayed by 15 minutes or more, Quote.com gives you access to real-time stock quotes for U.S. $19.95 per month—a useful capability for serious investors and a bargain compared to the fee charged by proprietary, real-time quote services. If you don't need real-time stock quotes, you can pay only U.S. $9.95 per month to access delayed stock quotes and other features such as Live Portfolios and Live Charts, which are Java applets that allow you to dynamically monitor your portfolio and the latest trading action on Wall Street. Quote.com also provides free resources, such

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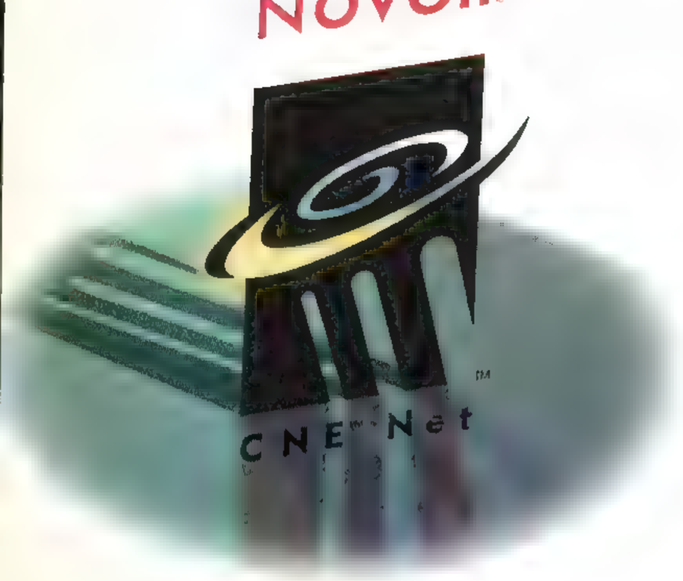

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*All products included in CNE Product Link are limited-user versions. Only CNEs and Master CNEs who are current with their Novell certification requirements are eligible to purchase CNE Product Link.

Circle 124 on the reader service card.

Product Snapshots

When I am looking for the latest computer games, I often find new and interesting products. Product Snapshots gives you a quick overview of the most useful products I have found during the last month. (Please note that these are first-look reviews; I have not conducted exhaustive testing.)

WINMAN 1.5

WinMan 1.5 from Atlantis Software Inc. is a snap-in product for Novell's ManageWise 2.1. By adding WinMan 1.5 to ManageWise, you can control the layout of screens on the ManageWise console. After you have specified how you want these screens to appear, you can save this information in a profile. WinMan 1.5 then uses the profile to display the screens the way you want whenever you access ManageWise. As a result, you no longer have to open, close, and resize screens every time you want to monitor a different system that has ManageWise installed.

You can also use WinMan 1.5 to define which screens should load when you launch ManageWise. In addition, you can use WinMan 1.5 to assign specific management tasks to other network administrators in your company. To assign these tasks, you simply create a profile containing the screens necessary to perform the tasks, and you export this profile to the appropriate network administrator's ManageWise console.

You can purchase WinMan 1.5 through retail channels at the suggested retail price of U.S. $149.95 per ManageWise console. For more information about WinMan 1.5, visit Atlantis Software's World-Wide Web (WWW) site (http://www.atlantissoftware.com). You can also call 1-510-796-2180.

SECURECONSOLE 2.0

SecureConsole 2.0 for NetWare from Protocom Development Systems Ltd. is a security application that allows you to control and monitor users' access to an IntranetWare, NetWare 4, or NetWare 3 server console. With SecureConsole 2.0, you can specify users or groups that you want to access a server console, and you can limit these users or groups to using specific commands or applications. (See Figure 1.) As a result, you can grant different levels of access to individual users and groups. For example, you could limit a tape backup administrator to using only tape backup commands and applications. SecureConsole 2.0 would then prevent this user from using other commands and applications at the server console.

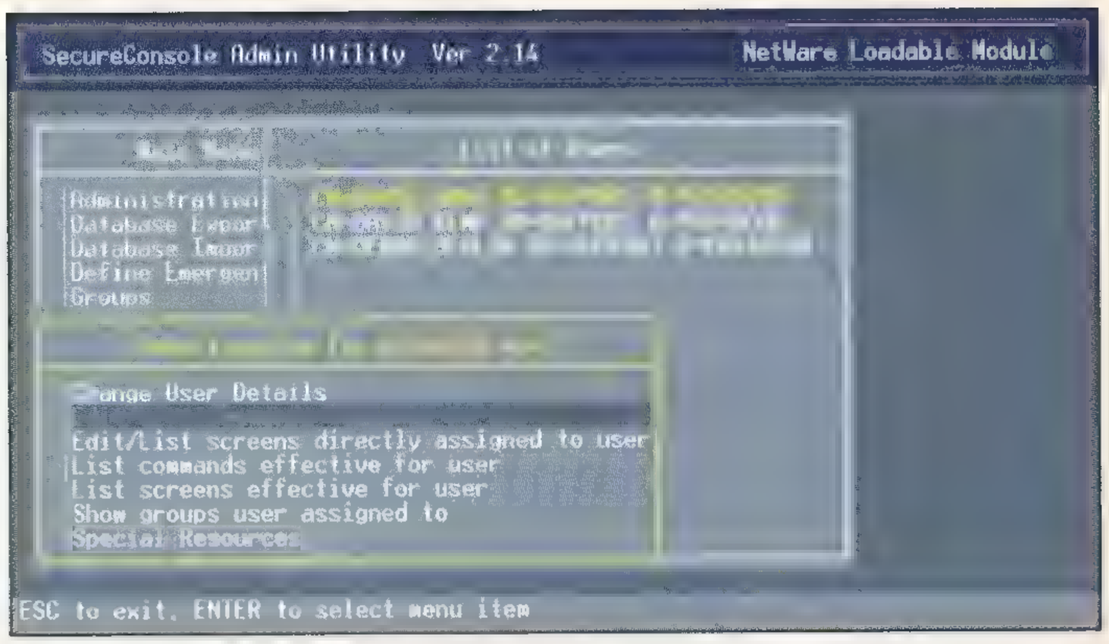

Figure 1. *SecureConsole 2.0 allows you to grant users access to the server console.*

SecureConsole 2.0 acts as a screen saver at the server console, prompting users to enter their IntranetWare or NetWare username and password. SecureConsole 2.0 then verifies these usernames and passwords through Novell Directory Services (NDS) or bindery emulation. Although SecureConsole 2.0 does support NDS users and groups, SecureConsole 2.0 stores its configuration information in a Btrieve database. However, SecureConsole 3.0, which is scheduled for release later this year, will store all of this information in the NDS database.

If a user is authorized to access the server console, SecureConsole 2.0 unlocks this server console but continues to verify the user's actions against the list of commands and applications you have configured. SecureConsole 2.0 maintains a log that contains each command entered by every user who logs in to the server console, including unauthorized commands. And because SecureConsole 2.0 supports the Simple Network Management Protocol (SNMP), you can configure SecureConsole 2.0 to send an alert to any SNMP console, such as a ManageWise console, whenever an unauthorized user tries to access the server console.

You can purchase SecureConsole 2.0 through retail channels at the suggested retail price of U.S. $595. For more information about SecureConsole 2.0, visit Protocom Development Systems's WWW site (http://www.serversystems.com). You can also call 1-800-581-3502, +61-6-292-9988, or +47-117-940-2020.

as industry updates, earnings estimates, and mutual fund reports by Lipper Analytical Services and Morningstar.

IPO Central provides news and information about companies that are planning an initial public offering (IPO) (http://www.ipocentral.com). Because IPO Central posts the most recent IPO filings and prices, you can keep track of upcoming IPOs so that you can purchase stock as soon as a company goes public. You can even sign up to receive a free, weekly e-mail update that contains the past week's IPO filings and the current week's expected IPO filings. If you are unfamiliar with the IPO market, you might want to first check out IPO Central's Beginner's Guide, which tells you everything you ever wanted to know about IPOs.

After you have done a little research and decided which companies you want to invest in, you can purchase stock online at E*TRADE (http://www.etrade.com). E*TRADE is an Internet-based stock brokerage service that charges only U.S. $14.95 for every transaction you conduct. If you typically purchase small amounts of stock and maintain a simple portfolio, E*TRADE is an ideal solution. Not only does E*TRADE charge a lower fee than most stock brokerage services, but E*TRADE also eliminates the hassle of finding a professional stock broker.

To purchase stock through E*TRADE, you must set up an E*TRADE account by completing the online application form. If E*TRADE approves your application, you can begin conducting transactions immediately, and you can view information about your account and your portfolio at any time.

You can also take advantage of other E*TRADE financial services. For example, you can trade securities, open an

Individual Retirement Account (IRA), get financial information about publicly held companies, and view the latest financial news from sources such as Reuters, PR Newswire, and Business Wire. In addition, you can customize a Personal Market Page that displays only the financial news and information you need, including market indicators, stock quotes, and real-time charts of market activity.

NETWORK RESOURCES

Novell recently released Novell Application Launcher (NAL) 2.0, the latest version of its popular software distribution product. With NAL 2.0, you can distribute applications to multiple servers and Windows-based workstations from a central location on your company's network or intranet. You can also schedule software distribution for off-peak hours, modify Windows registries and .INI files, and add or remove icons from Windows 95 Explorer, the Start menu, and the system tray on users' workstations.

Because NAL 2.0 is fully integrated with Novell Directory Services (NDS), you no longer need to maintain separate information about users and the applications they need. NAL 2.0 extends the NDS schema by adding Application objects, so you can create, modify, and view these objects in the NDS tree along with the rest of your company's users and network resources. By granting users rights to particular Application objects, you can quickly and easily distribute these applications across your company's network or intranet to the users who need them.

You can download a free copy of NAL 2.0 from http://www.novell.com/managewise/NAL/nal2.html. For more information about NAL 2.0, visit Novell's WWW site (http://www.novell.com/managewise/NAL). You can also call 1-800-NETWARE or 1-801-861-5588.

If you haven't tried Netscape Communicator yet, you should definitely check out Netscape Communicator 4.01, which Netscape Communications Corp. released only a few months ago. Although Netscape Communicator 4.01 makes an excellent WWW browser, you shouldn't assume that it is simply an upgrade to Netscape Navigator. Rather, Netscape Communicator 4.01 is a suite of applications that allows you to access information and communicate with other users over an intranet or the Internet. This suite also allows you to create HyperText Markup Language (HTML) pages and manage Netscape Communicator 4.01 on workstations throughout your company's network or intranet.

Netscape Communicator 4.01 is available in both a standard edition and a professional edition. The standard edition of Netscape Communicator 4.01 includes the following applications:

- **Netscape Navigator.** Netscape Navigator allows you to browse WWW sites. Netscape Communicator 4.01 includes Netscape Navigator 4.0, which supports Virtual Reality Markup Language (VRML) 2.0, Netscape's Dynamic HTML technology, and Microsoft's ActiveX standard.
- **Netscape Collabra.** Netscape Collabra allows you to access both public and private newsgroups. With Netscape Collabra, you can post HTML documents, graphics, and Java applets in these newsgroups.
- **Netscape Netcaster.** Netscape Netcaster is the client software for Netcaster, Netscape's new push technology service. With Netscape Netcaster, you can subscribe to one or more channels that send news and information to your desktop in much the same way that a television or radio channel broadcasts programs. After you select the type of news and information you want to receive, Netscape Netcaster sends you frequent updates, downloading the latest news and information in the background while you perform other tasks. Because Netscape Netcaster includes client software for Marimba's Castanet push technology service, you can also subscribe to Castanet channels. (For more information about push technology services, see "Online Connection: Pushing the Envelope," *NetWare Connection*, July 1997, pp. 49–51. You can download this article from http://www.novell.com/nwc/jul.97/onlin77.)
- **Netscape Messenger.** Netscape Messenger is a completely redesigned version of Netscape's e-mail client software. Netscape Messenger supports secure e-mail messages via the Secure Multipurpose Internet Mail Extensions (S/MIME) protocol and the HTML

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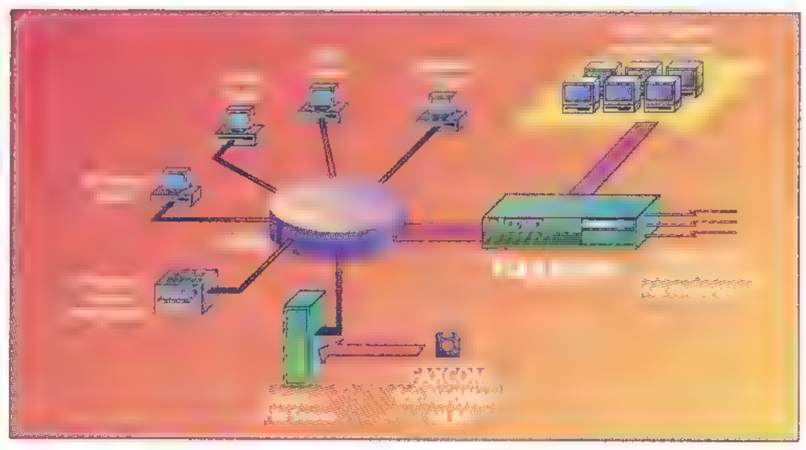

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mail standard, which allows you to send e-mail messages that look like HTML pages. Netscape Messenger also supports vCard digital business cards.

- **Netscape Conference.** Netscape Conference allows you to make online conference calls, share a virtual whiteboard with other users, or conduct a text-based discussion over an intranet or the Internet. With Netscape Conference, you can also upload and download files and applications during a conference call. In addition, you can send voice-mail messages to a user's e-mail address.
- **Netscape Composer.** Netscape Composer allows you to create HTML documents. Like a word-processing application, Netscape Composer uses fonts, styles, paragraphs, and lists and even includes an integrated spell checker. With Netscape Composer, you can use these features to create HTML documents, and you can then publish these documents on your company's intranet or Internet site with a single click of your mouse. Because Netscape Composer is fully integrated with all of the other Netscape Communicator applications, you can also display these documents or send them to other users with Netscape Messenger, Netscape Conference, or Netscape Collabra.

The professional edition of Netscape Communicator 4.01 includes the applications that come with the standard edition, as well as the following applications:

- **Netscape Calendar.** Netscape Calendar allows you to schedule meetings with other users and reserve conference rooms in real time.
- **Netscape IBM Host On-Demand.** Netscape IBM Host On-Demand is a Java-based application that allows you to access files and applications stored on IBM host systems from an intranet or the Internet.
- **Netscape AutoAdmin.** Netscape AutoAdmin allows you to install, configure, and upgrade Netscape Communicator 4.01 on multiple workstations from a central location on your company's network or intranet. You can also install, configure, and upgrade plug-in software for Netscape Communicator 4.01 on multiple workstations.

Netscape Communicator 4.01 supports platforms such as Windows NT, Windows 95, Windows 3.1, Macintosh, Power PC, and several UNIX operating systems. In addition, Netscape Communicator 4.01 is available in English, French, German, and Japanese versions.

You can download a free evaluation copy of Netscape Communicator 4.01 from http://home.netscape.com/comprod/mirror/client_download.html, or you can purchase Netscape Communicator 4.01 for U.S. $59 at http://www.netscape.com/flash1/comprod/products/communicator/index.html. If you pay U.S. $80, you can also receive free upgrades for one year.

For more information about Netscape Communicator 4.01, visit Netscape Communications's WWW site (http://www.netscape.com/flash1/comprod/products/communicator/index.html). You can also call 1-415-937-3777.

NETWORK GAME OF THE MONTH

Darklight Conflict from Electronic Arts is one of the best shoot-'em-up space games released this summer. In fact, Darklight Conflict is a visual treat, with extremely realistic explosions and lighting effects. When you begin the game, you have just been abducted by

members of an alien civilization, and you have been physically altered to look like their enemies. You are then sent on a mission to discover the enemies' technology and to destroy their civilization.

You can play Darklight Conflict in either single-player mode or multiplayer mode. If you choose single-player mode, you can participate in more than 50 virtual training missions that help you acquire critical game skills such as engaging in combat, conducting bombing raids, and leading rescue missions.

If you choose multiplayer mode, you can play Darklight Conflict with up to five other people over a network connection. Multiplayer mode allows you to interact with other players in a variety of ways: You can play a death match, in which the game is every player for himself or herself; you can play cooperatively against a common enemy; or you can play capture the flag, in which the first player to meet the game's objective wins.

Darklight Conflict is available for DOS and Windows 95. You can purchase Darklight Conflict through retail channels at the suggested retail price of U.S. $49.95, and you can also download a demo version of the game from ftp://ftp.ea.com/pub/demos/dark/dcdemo.zip.

For more information about Darklight Conflict, visit Electronic Arts's WWW site (http://www.ea.com). You can also call 1-800-245-4525 or 1-415-571-7171.

STANDALONE GAME OF THE MONTH

Shivers II: Harvest of Souls from Sierra Online is a sequel to the popular adventure game, Shivers. Like Shivers, Shivers II: Harvest of Souls takes players in the fictional desert town of Cyclone, Arizona. Some of your friends are members of a rock-and-roll band, and they are spending the summer in Cyclone making a music video. You decide to visit them, but when you arrive in Cyclone, you discover that your friends are missing and Cyclone is nearly deserted. The only person roaming the streets is a masked man named Darkcloud.

The object of Shivers II: Harvest of Souls is to find your friends by searching several mysterious music videos for cryptic messages. You can also follow Darkcloud as he wanders through Cyclone. However, you should be wary of this spooky stranger: Although Darkcloud will often guide you to important clues, he will sometimes lead you into danger.

Shivers II: Harvest of Souls is available for Windows 95 and Windows 3.1. You can purchase Shivers II: Harvest of Souls through retail channels at the suggested retail price of U.S. $59, and you can download a demo version of the game from http://www.sierra.com/titles/shivers2/site/demo.html.

For more information about Shivers II: Harvest of Souls, visit Sierra Online's WWW site (http://www.sierra.com). You can also call 1-800-757-7707 or 1-425-746-5771. ●

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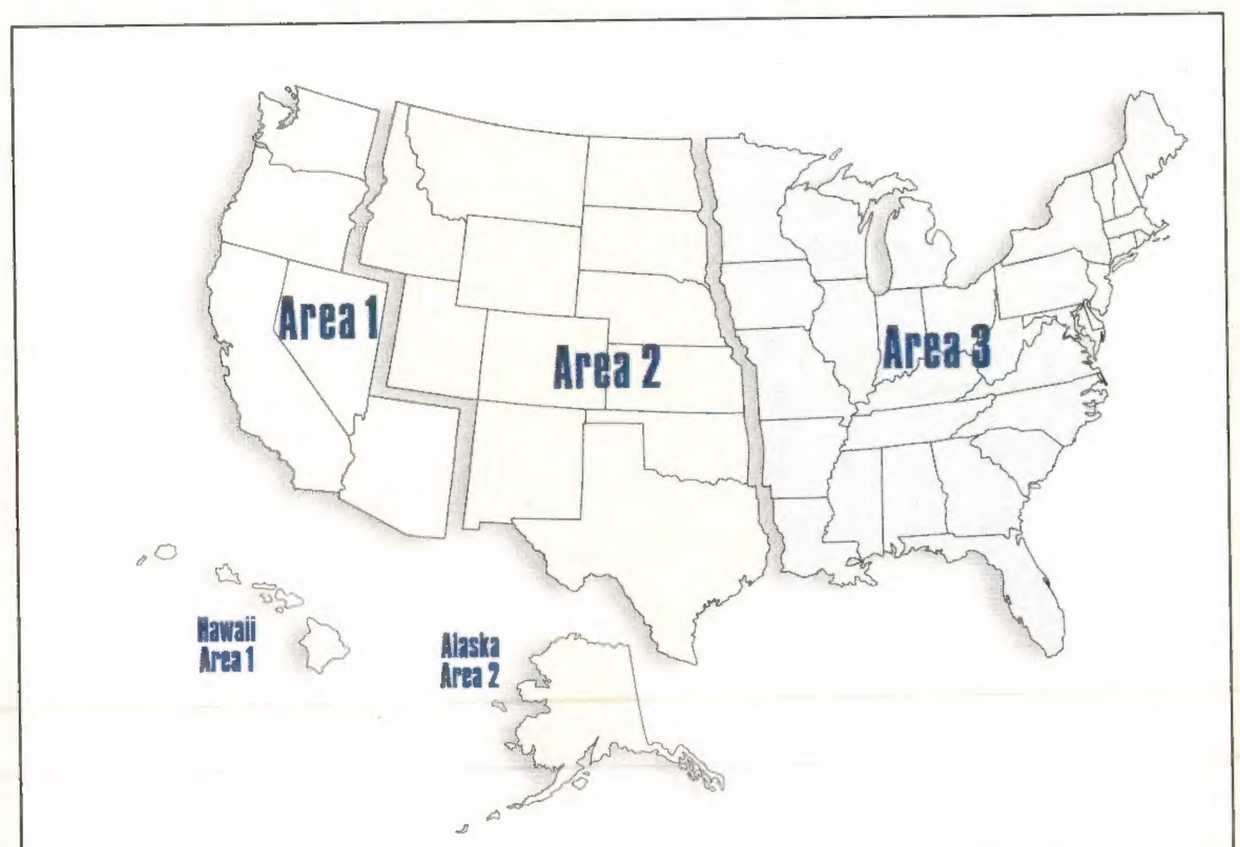

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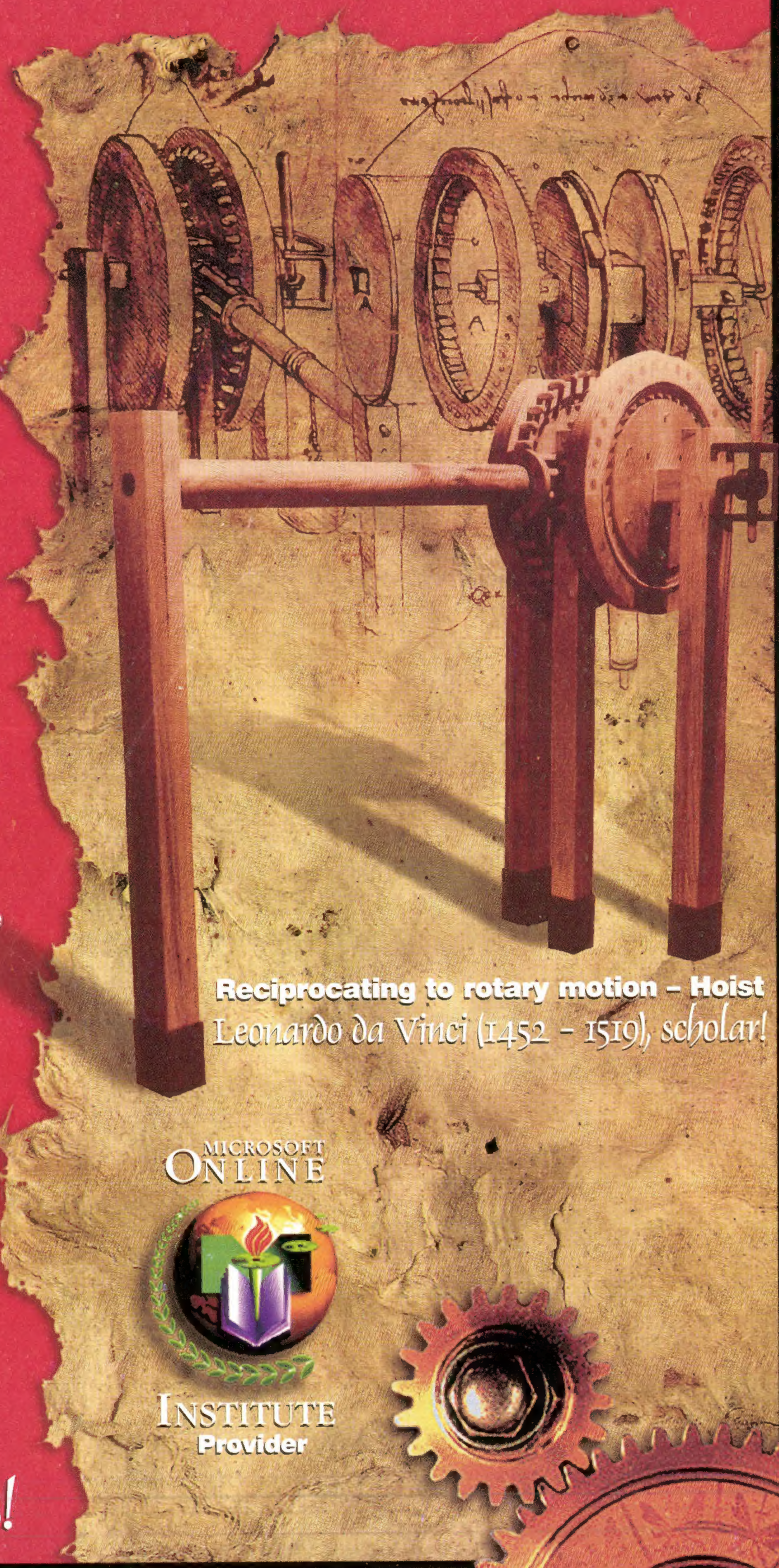

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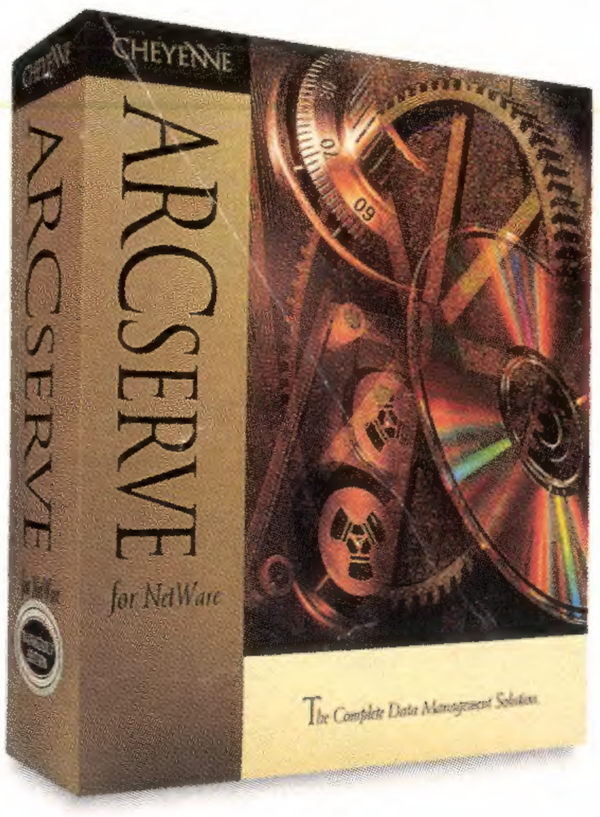

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